Greene Plantae Bakerianae.

PLANTÆ BAKERIANÆ

By EDW. L. GREENE,

AND OTHERS.

VOLUME I.

FASCICLE 1.

FUNGI TO IRIDACEÆ.

Price, Forty Cents.

PLANTÆ BAKERIANÆ.

Under the above title, for the purpose of citation easily abbreviated to Pl. Baker., it is proposed to issue a series of lists of plants collected by Mr. Carl F. Baker and his colleagues and distributed to various herbaria on both sides of the Atlantic.

The first volume of these Catalogues will include the collections of 1898 by Messrs. C. F. Baker, F. S. Earle and S. M. Tracy in Southern Colorado. The sets were distributed nearly two years since, and, as regards the flowering plants, under names in a very great many cases far from correct. Nearly all were subsequently submitted to me for determination; and this list, in so far as I have edited it, will be approximately correct as to the identity and nomenclature of the species.

Edw. L. Greene.

Catholic University of America,
Washington, D. C., 23 Jan., 1901.

Narrative.

By F. S. Earle.

In planning a botanical collecting trip to Southwestern Colorado our objects were first, to secure sets of plants representative of the flora of this interesting region; and, second, to study in the field the effect of altitude and exposure on the variability and the distribution of species. It was at first hoped that we might be able to examine somewhat critically the La Plata Mountains in the extreme Southwestern part of the State, and also considerable portions of the larger neighboring range of the San Juan. Lack of time prevented carrying out the latter plan, the work being confined exclusively to the La Plata Range, and the neighboring lower levels. The region proved admirably adapted to the purposes of the expedition. The Range is isolated, and though small in area is of considerable altitude, the central peak, Mt. Hesperus, holding its rugged snow-streaked crest at the height of 13,300 feet. As seen from the west this mountain presents a peculiar and fantastic appearance. The portion above timber line is a regularly outlined rock pyramid formed of nearly horizontal strata of various colors giving a curious banded effect; while numerous gulches filled with snow mark it with vertical lines of white. Mt. Hesperus is flanked and supported on the North by Shark's Tooth, a pinnacle of rock well deserving its name; on the South by the jagged double peak of Mt. Moss, or Mt. Hayden as it is locally called, and on the East by Snowstorm Peak, which justified its cognomen during our stay in its neighborhood by covering itself with a fresh coat of white in the middle of July. None of these

outlying peaks rival the central mass of Mt. Hesperus, but all reach nearly or quite 13,000 feet, and their sheltered gulches hold abundant snow far into the summer to feed the mountain brooks, and furnish moisture for the luxuriant alpine vegetation that springs up like magic as the snow line retreats. From the basins between these peaks arise many streams. The La Plata River rises to the eastward of Hesperus and flows nearly due South; East, Middle, and West Mancos creeks flow from its western flanks, all uniting above the town of the same name to form the Mancos River, which flows in a southwesterly direction. Bear Creek rising North of Hesperus, between that peak and Shark's Tooth, flows to the northwestward, while the drainage from the eastern side of Shark's Tooth and Snowstorm Peak and is tributary to the Las Animas.

Two of our party reached the little town of Mancos on the Rio Grande Southern railway on Tuesday, June 21, 1898, and went into camp near the river to await the coming of the third member who had been detained at his home in Mississippi by a suddenly-imposed yellow fever quarantine.

The valley at Mancos is from one to two miles wide. Formerly a sage plain, it is now, thanks to irrigation, mostly covered with green wheat and alfalfa fields. Owing to its elevation, 7,000 feet, corn and the more tender vegetables can not be grown on the Mancos. To the North and East the valley is bounded by the foot hills and lower ridges of the La Plata Range, the snow-streaked top of Hesperus being plainly visible. The hills bounding the valley to the South are strikingly different from these in conformation, being flat-topped with precipitous sides, evidently belonging to the great mesa formation of the Southwest. The steep northern slopes of these mesas facing the valley

are covered by a dense growth of chaparral, giving them in the distance a deep blue or almost black effect. This chaparral consists largely of scrub oak *Quercus undulata* interspersed or sometimes almost replaced by clumps of Amelanchier, Peraphyllum, Rhus, Fendlera, and Cercocarpus. The summits of the lower foot hills on either side of the valley support a scattered growth of nut pine and red cedar, *Pinus edulis* and *Juniperus monosperma*. Looking westward the eye wanders over great stretches of undulating sage plains and piñon-covered ridges to the Blue Mountains of Utah a hundred miles away. Southwestward the view is limited by the less elevated Ute Mountain Range, lying distant some thirty miles.

The five days of a necessary detention at Mancos were devoted to the flora of the valley; and these proved quite as instructive as any equal portion of time spent at higher altitudes. Three well-defined floral belts were reached from this riverside camp. First, the flood plain of the Mancos, a narrow bottom, varying from a few yards to a quarter of a mile in width. Some parts of it are grassy and meadow-like; others occupied by swampy thicket. The largest trees are those of the narrow-leaved poplar, *Populus angustifolia*; and this was the only member of its genus seen here, except the aspen. The buffalo berry, *Lepargyrea argentea*, conspicuous by its silver-gray foliage, is abundant, forming large clumps, and reaching the height of fifteen and even twenty feet. The thickets are composed of various willows, interspersed with some choke-cherry trees, *Cerasus demissa*, and dogwoods, *Cornus stolonifera*; these supplemented by dense masses of *Distegia involucrata* reminding one of the hedges of so-called "buckbrush," *Cephalanthus*, bordering the banks of swampy lakes in Mississippi River bottoms.

At this elevation the *Distegia* (the *Lonicera involucrata* of

some authors) attains the height of eight or ten feet; but up near the timber-line it is a dwarf of sometimes not more than one or two feet. The more conspicuous herbaceous plants of these thickets are *Mertensia ciliata*, *Geranium Richardsonii*, a new species of buttercup, *Ranunculus Earlei* (Greene), and *Polemonium filicinum*, a species originally from southern New Mexico, and which here it may be assumed, reaches its northern limit of distribution. Among such as these were also gathered a few herbaceous plants, notably *Carex aurea* and *Collomia lanceolata*, and several more, which are more properly subalpine and alpine. And as we afterwards grew familiar with the whole region, including the higher elevations about the headwaters of this stream less than twenty miles away, the wonder constantly grew, not that only a few alpine or subalpine plants should occur in the valley below, but that so few of these species had been able to adapt themselves to the condition of the lower levels even where the cool thickets furnished such excellent shade with abundant moisture, and the rapidly flowing stream offered such abundant facilities for the downward distribution of seeds. As a rule the Mancos specimens of species having a considerable altitudinal distribution were taller and more slender than those subsequently taken in mountain meadows; which variation seems attributable partly, at least, to their having grown in the shade. But in other cases, such as the *Collomia* and *Carex aurea*, the low elevation seemed to have had the opposite effect of dwarfing the plants; specimens from about Mancos being much smaller than those taken at elevations greater by a thousand feet.

Separated from the flood-plain by a steep bank five to fifteen or even twenty feet high, and constituting a more elevated secondary bottom, the sage plain stretches away for a mile or more on either side of the valley to the foot-

hills. This tract, as I have said, has in part been reclaimed and brought under cultivation. Originally it was covered with low-growing gray-green chenopodiaceous and composite shrubs, such as constitute what is commonly called sage brush. Those portions not under cultivation exhibit these growths, intermixed with clumps of bushy *Amelanchier* and *Peraphyllum* representing the family of the Pomaceæ; and it also supports a peculiar and most interesting herbaceous flora, made up of *Lupinus argenteus* and other lupines, numerous species of *Astragalus* and other papilionaceæ, several Pentstemons and Castilleias, *Allium acuminatum* and *Calochortus Gunnisonii* representing the lily family.

The piñon belt occupies the low foothills from 100 to 400 or 500 feet above the valley. Here *Pinus edulis* and *Juniperus monosperma* combine in not unequal proportions to form a low scraggy woodland growth. Neither species often exceeds twenty feet in height, and each is frequently adorned by its own species of parasitic *Razoumoffskia* and *Phoradendron*. Herbage is scanty in this belt, and the herbaceous species quite characteristic, like *Lescuriella Palmeri*, *Pentstemon linarioides*, *Astragalus scopulorum* and *Picradenia Richardsonii*.

Our belated Mississippian, Professor Tracy, arrived in the morning of June 26 and we started at once for the western flank of Mt. Hesperus, our wagon piled high with boxes of paper, presses, bundles of driers and camp equipage. Our plan was to make a somewhat permanent camp as near timber line as we could go with a wagon, and then to take time to thoroughly explore the country both above and below. Our road started due north from Mancos but soon bore northeast and followed up a rather narrow ridge or divide between the deep rocky cañon of the West Mancos on the right, and Chicken Creek, a smaller tributary of the

Mancos, on the left. About four miles from town, and at an elevation of some 7,500 feet, we left the piñons and the chaparral-covered hillsides through which we had been traveling, and came suddenly into magnificent open pine woods. Our driver told us that the lumbermen distinguished two kinds of pine, but all seemed to be *Pinus scopulorum* the difference in the timber being probably due to differences in the age and condition of the trees. Many of the pines are of large size and the ground between them, while mostly clear of brushwood, yields a sufficient growth of grass and herbage to give it an attractive park-like effect. Though the collecting in this lower part of the pine belt was not specially interesting, it furnished a few characteristic plants, such as *Lotus Wrightii* and *Lithospermum multiflorum.*

Advancing toward higher ground, the winding road brought us to an elevation of about 9,000 feet, where the pines give place to aspen thickets. At this point we obtained our first impression of the riches of vegetation belonging to the higher mountains; for the aspen thickets of limited extent were found to alternate with considerable stretches of native meadow brilliant with a great diversity of flowers blooming among the abundant grasses. Fields of the large sunflower-like *Wyethia Arizonica*, clumps of purple lupine bordering these, red Castilleias and white *Polygonum bistortoides*, Potentillas of several sorts along with other things as showy combined to form a beautiful and most inviting botanical landscape.

Still continuing the gradual ascent, spruces (*Picea Engelmannii*) began to intersperse themselves in groups among the aspen clumps, becoming gradually more and more preponderant, until finally the aspens cease altogether at 11,000 eet, where the spruces thenceforward hold undisputed sway

up to the timber-line which, in this latitude, is at about 11,500 feet.

Having made a late start, on this first day of the ascent, we covered only about fifteen miles, camping for the night near the head of Chicken Creek. A little beyond this point our road descended abruptly into the West Mancos Cañon, thence following that stream up to Jackson's stamp mill, at the very base of Mt. Hesperus. The difficulty of getting our heavy outfit back out of this deep cañon seemed so great that we decided to keep on up the ridge, following some old cattle and pack trails as far as it should prove practicable to take the wagon. We succeeded in getting three or four miles further, and made our second camp on the headwaters of a little tributary of the West Mancos locally known as Bob Creek. We had reached an elevation of 10,500 feet and were about two and a half miles due west of the main peak of Mt. Hesperus, but with the deep and rugged valley of Slide Rock Creek lying between. The laborious climb out of this valley with a heavy load of plants, after a day's collecting on Hesperus convinced us that we had made a mistake in not taking the lower road and so pitching our camp in the cañon, when the homeward trip would always have been down hill.

The region above timber was reached in three different places from this Bob Creek camp, on the southwest face of the ridge between West Mancos and Slide Rock Creeks, which constitutes the westernmost spur of Mt. Hesperus, on the north face of the same ridge farther east near the head of Slide Rock Creek, and on the Bear Creek divide northeast of camp. In all these places the ground was rather dry and exposed. Many interesting plants were taken, but the full glory of the alpine vegetation was not seen till we

reached the moister basins at the head of the La Plata River on the eastern side of the range.

One of the most interesting features of this western flank of the range was the great reaches of verdant mountain meadow stretching away in every direction between the scattered clumps of spruces and aspens. The grass, consisting largely of Poas and Festucas, was exceedingly luxuriant and was everywhere sprinkled or crowded by showy species of Mertensia, Polemonium, Valerianella, Frasera, Veratrum, Aconitum, Delphinium and numberless other smaller flowering plants.

The morning of July 6 found us breaking camp and starting on the return trip to Mancos. The season was now at its height, and it was marvelous to see how rapidly vegetation was developing at these high altitudes. Had time permitted we should gladly have lingered longer at this camp, for each day brought new species into bloom, and it seemed to our regretful eyes that we were leaving more still undeveloped species behind us than we had found in condition to collect. The trip back to Mancos occupied two days, as much time was consumed in collecting on the way the things that had opened during our brief absence. A further stop of two days in Mancos enabled us to pack and ship the dried plants that had accumulated, and to take a short side trip over the sage plains to the southwestward along the road toward Cortez, in the direction of the Ute Mountain. This day's collecting proved to be the richest in the number of specimens taken and in the number of new species of flowering plants discovered of any on the entire trip, thus showing that in planning future work in this region the lower levels should receive careful attention.

The afternoon of July 9 found us again under way for a trip up the La Plata Valley on the east side of Mt.

Hesperus. Our route lay over some low divides through a rather uninteresting country, part of the time in oak chaparral, and at times getting up into the open pine belt. During the afternoon of July 10 we passed Dix P. O. and reached the old mining camp of Parrott City at the foot of the mountains, just at the entrance to the cañon of the La Plata River. Continuing a few miles further, we made camp in the bottom of the cañon about two miles south of La Plata City. This was one of the richest spots visited. The bottom of the valley is only a few hundred yards wide, and it is walled in on either side by the precipitous slopes of the mountains. It is very moist, and is filled with a luxuriant tangle of vegetation. *Rubus Nutkanus* here grows to perfection, and the ground is fairly carpeted with the showy *Erigeron coulteri* and *Penstemon glaucus stenosepalus*. The gravel banks in the stream also furnished conspicuous and abundant species, including *Epilobium latifolium* and *Senecio atratus*. The elevation here was about 9,000 feet.

On July 12 we again moved camp going toward the head of the valley. Above the town of La Plata the cañon grows much narrower and the grade is much steeper. The road is soon forced to leave the stream and is cut into the hillside. For a considerable distance no suitable place for a camp could be found, but finally just below the mouth of Basin Creek, at about 10,000 feet elevation, a projecting ledge of rock gave us just room to put up the tent and get the wagon out of the road. Stakes being out of the question tent ropes were made fast to boulders, and our quarters, though restricted, proved sufficiently comfortable. Wagon roads have been constructed several miles farther to reach various stamp mills, but they were so rough and steep that we did not attempt to take our heavy outfit beyond this

point but made daily trips above timber line in various directions.

The basins of the small streams far above timber line were here all veritable alpine gardens well stocked with Mertensias, Polemoniums, Trifoliums, Erigerons, Castilleias and many other showy alpine genera. Even the most rugged slopes exhibited a great diversity of species; for every nook and crevice among the rocks where any soil had found a lodgment was filled with plants. On the very summit of Mt. Hayden at 13,000 feet we gathered excellent specimens of *Trifolium nanum*, *Chionophila Jamesii*, *Ligusticum Eastwoodiæ* and *Pentstemon Harbourii*.

It is to be noted that about three-fourths of the plants collected here were of species not represented at any of the lower altitudes.

It was with much regret that on July 16 we took leave of this interesting locality and made our way to Durango. Each little sheltered slope and basin that we visited furnished some plant not seen elsewhere, and, had time permitted a thorough exploration of the region our list of species would have received many additions. Furthermore, the flowering season had not yet reached its fullness. Very many species were not yet beginning to bloom, and it was manifest that a month's sojourn would have enabled us to nearly double our collections.

This Alpine research was disappointing in respect to only two groups of plants. Of ferns we took but two species, *Cystopteris fragilis* and *Cryptogramme acrostichoides*; and the number of lichens was much smaller than had been anticipated. The bare rocks supported a fair number of crustaceous species, which, owing to the early loss of our chisel, we were unable to collect; and terrestrial and arboreal species were very scarce.

Durango is a thriving town located in the valley of the Las Animas river at an elevation of 6,500 feet. South of the town the hills rise 1,000 or 1,500 feet higher. They are mostly composed of beds of shale with a few coal-bearing strata and so give but few plants of interest during the hot midsummer months, even along the narrow ravines and arroyas. The Grindelias, Mentzelias and Eriogonums found within the city limits proved fully as interesting as the plants of these nearby hills. In some places they support a considerable growth of *Juniperus monosperma* with scattered trees of piñon. Near the eastern edge of the town one small hill was noticed that had been covered by a rather dense growth of this juniper, but now only a few of the trees were living, the others having apparently been killed by *Gymnosporangium speciosum* Peck, which had left the swollen and distorted trunks marked with its peculiar plicate tumors.

North of town toward Trimble Springs the Animas valley is somewhat broader, though bounded on each side by precipitous mountain walls which rise from 2,000 to 2,500 feet above the stream. Every acre of irrigable land is in a high state of cultivation, hay or green fields and orchards filling all the valley from Durango to where the Hermosa River joins the Animas. Here we noted similar willows to those found at Mancos and at the base of the cliffs were box elders and *Ribes cereum.*

Through the kindness of Col. Thomas Hamor, of Durango, we were enabled to make a somewhat hasty trip to Columbine, twenty-five miles north of Durango, on the old Silverton trail, and only a few miles to the eastward of our Upper La Plata camp. The place is near the head of the valley, and Hamor's Lake, a picturesquely beautiful sheet of water, is one of the sources of the Las Animas river. The lake

seems to have been formed by the sudden closing in of the cañon wall so that though not large it is of great depth. It is as clear as crystal and even after our visit it still contains some magnificent trout. The elevation here is about 9,000 feet and the hills and wet meadows near the lake yielded a greater number of species than any other equal area that we visited. In the water of the lake itself was an abundance of Chara Hippuris and Potamogeton while on its borders were *Thalictrum alpinum, Gentiana heterosepala, Swertia scopulina, Agastache urticæfolia, Lilium montanum* and many other species not taken elsewhere.

Mr. Tracy, who was the last to arrive, remained in the neighborhood of Durango until July 28. Messrs. Earle and Baker departed on the 18th and 19th respectively, making about an even month in the field for each of the three members of the expedition.

Perhaps the most striking impression gained by the trip, aside from that produced by the abundance and beauty of the high alpine flora, is that of the distinctness with which the different altitudinal floral zones are marked out and limited. It is true a few species were found all the way from the Mancos River bottoms at 7,000 feet to timber line at 11,500 feet, but these instances are rare. In the great majority of cases each species observed had an altitudinal range of not to exceed 1,000 feet, even with similar conditions of soil and moisture. In a general way these life zones seemed to be the same here as in the not far distant San Francisco Mountains of Arizona, where they have been so carefully studied by Dr. Merriam, of the U. S. Biological Survey. We could easily distinguish the piñon-cedar belt, the pine belt, the aspen-spruce belt and the timber line belt as designated by him, and we found this division a very useful one in the prosecution of our work.

While we endeavored to make our work as thorough as possible for the very limited region actually explored, we realize fully that it is only a beginning. The number of plants collected serves to illustrate the great floral richness of the region, and our experience suggests that for future work the higher mountains should be visited during the period from July 15 to September 1, when an almost entirely new set of plants would be in bloom; and that work in the lower levels, especially in the cañon and mesa region south and west of Mancos is greatly needed earlier in the season, say from May 1 to June 15. It is hoped that at least some of our party may be able to continue the work another season.

CATALOGUE.

Fungi.

By S. M. Tracy and F. S. Earle.

Among the more striking features of the fungus flora of the region which the collection represents may be mentioned the great abundance of the *Uredinales* and *Sphæriales*. The *Erysibaceæ* would have been abundant later in the season, though only two species were found in condition to collect. *Perisporaceæ* were entirely lacking, as were also the *Hysteriales*, though the latter were persistently sought for everywhere. The *Pezizales* are represented by only two species. The *Helvellales* do not appear in the list, but fine specimens of *Morchella* and *Gyromitra* were observed in the high spruce woods. The *Agaricaceæ* are very scantily represented in the list, but they were really quite abundant in moist locations at the higher altitudes. Lack of time and of facilities for properly drying the specimens prevented collecting them. Among the *Sphæriales* which constitute nearly a *third of all* the species collected, and of which considerably over one-half proved to be undescribed, the almost entire absence of such common eastern genera as *Hypoxylon* and *Valsa* is to be noted, as well as the great abundance of *Lophiostomataceæ*, a family rarely found by eastern collectors. The Dothideales and Hypocreales are each represented by a single species only.

It is interesting to note that of the entire collection only the following five species were taken above timber line: *Schizonella melogramma*, *Puccinia acrophila*, *P. Claytoniatum*, *P. Pimpinellæ* and *Patinella Crandallii*. The smallness of this list is to be accounted for in great part by the fact that our

time above timber line was always limited and that the beauty and abundance of the flowering plants claimed our attention, to the neglect of the Fungi.

In the following list the sequence of families is that of Engler & Prantl. In the few cases in which the generic name used by us is another than that employed by Saccardo in the *Sylloge Fungorum*, the latter is added in parenthesis.

Peronosporaceæ.

Albugo candidus (Pers.), Kuntze, Rev. Gen. ii: 658. Little Kate mine, La Plata Mts., 11,000 feet, July 13, on *Sophia*, n. 1084.

Bremia Lactucæ, Regel, Bot. Zeit. St. 39. Tab. 3. Mancos, 7,000 feet, June 24, on *Agoseris*, n. 1,089.

Peronospora arenariæ macrospora, Farlow, Bot. Gaz. ix: 38. Bob Creek, west of Mt. Hesperus, 11,000 feet, July 5, on *Silene*, n. 340. This corresponds very closely to specimens collected in Illinois, and so determined by Farlow, l. c. The differences he so clearly pointed out between this and the European *P. Arenariæ* indicate it to be a distinct species, but as our specimens are mostly without oospores we decline to make the change, and write the name as above.

Peronospora parasitica (Pers.), Fr., Sum. Veg. 493. Chicken Creek, west of Mt. Hesperus, 9,000 feet, July 6, on *Arabis*, n. 1,085; also on *Sophia*, at Mancos, 7,000 feet, June 24, on *Sophia*, distorting the stems; n. 1087. This common parasite was observed on various cruciferous hosts throughout the region.

Ustilaginaceæ.

Schizonella melogramma (DC.), Schrœt, Pilz. Schles.

275. Bob Creek, west of Mt. Hesperus, 10,500 feet, July 5, on *Carex atrata*, n. 1,032; Little Kate mine, La Plata Mts., 11,500 feet, July 14, on *Carex*, n. 1,035.

Tilletia asperifolia, Ell. & Ev., Jour. Myc. iii., 1,055, Durango, 6,500 feet, July 26, n. 1,034, on *Sporobolus asperifolius*.

Ustilago bromivora, Fisch. Apercu, 22. On hills above Parrott City, July 10, on *Bromus ciliatus*, n. 1,033.

Ustilago Hilariæ, Ellis & Tracy, Journ. Myc. viii, 77. At Mancos, 7,000 feet, July 8, on *Hilaria Jamesii*, n. 1,080.

Ustilago segetum (Bull.) Dit. in Sturm, DC. Fl. Fr. iii, 67. On Chicken Creek, 7,000 to 8,000 feet, July 7, on *Danthonia*, n. 385.

Uredinaceæ.

Æcidium abundans, Peck, Bot. Gaz. iii. 38. Upper La Plata River, at 10,000 feet, July 13, on *Symphoricarpus*, n. 1070.

Æcidium album, Clint. Rep. N. Y. Mus. xxvi. 76. On Bob Creek, 10,500 feet, on *Vicia*, n. 1048.

Æcidium Clematitis, DC. Fl. Fr. ii. 243. Foothills above Dix, 8,000 feet, July 10, on *Clematis Douglasii*, n. 1051.

Æcidium Compositarum Lactucæ, Burrill, Bull. Ill. State Lab. ii. 232. Chicken Creek, 9,000 feet, July 10, on *Lactuca*, n. 351; also Mt. Hesperus, 10,000 feet, June 30, on *Agoseris*, n. 342.

Æcidium Epilobii, DC. Fl. Fr. ii. 238. Bob Creek, at 10,000 feet, June 28, on *Epilobium*, n. 178.

Æcidium Fendleri, n. sp. Mostly hypophyllous; spots large, often 1 cm broad, deep red, bordered with yellow,

substratum not thickened, pseudoperidia scattered thickly over the entire lower face of the spot but not crowded, bright yellow, height about equalling diameter (400μ), margin irregularly lacerate, recurved, cells loosely joined, irregularly polygonal, walls thick, 4–5μ, conspicuously roughened, 20–30μ; spores subglobose, bright yellow, minutely roughened, about 20μ; spermagonia honey-yellow, inconspicuous, barely 200μ. Mancos, 7,000 feet, July 7, on leaves of *Berberis Fendleri*, n. 381. This differs from *Æ. Berberidis* in the larger, not thickened spots, the less crowded perithecia, the larger and more ornate peridial cells, and in its slightly roughened spores.

Æcidium hemisphæricum Peck, Bot. Gaz. iii. 34. Durango, 6,500 feet, July 26, on *Lactuca*, n. 1072. These specimens also show what seems to be *Puccinia Prenanthis* (Pers.), Fckl. II & III. They are from leaves of the same plant as No. 1071.

Æcidium Hydrophylli Peck, Rep. N. Y. Mus. xxvi. 78. La Plata River, 9,000 feet, July 11, on *Hydrophyllum*, n. 1067.

Æcidium incurvum n. sp. Amphigenous; spots none; irregularly clustered, deeply buried, scarcely emergent, opening of pseudoperidium very narrow, limb short, irregularly lacerate, incurved, cells thin, striate, 40–50x20–25μ; spores globose or broadly oval, dark colored, epispore thick, slightly echinulate, 40–50x20–25μ; spermagonia not seen. Chicken Creek, 9,000 feet, July 7, on *Erigeron flagellaris*, n. 1055.

Æcidium intermixtum Peck, Bot. Gaz. iv. 231. At Limon, June 24, on *Iva axillaris*, n. 1037.

Æcidium monoicum, Peck, Bot. Gaz. iv. 320. At 10,000 feet, on Mt. Hesperus, July 6, the host some species of *Arabis*, n. 1086.

ÆCIDIUM OROBI, Pers., in Rœmer Mag. i. 82. At Mancos, on *Lathyrus*, 7 July, n. 1049.

ÆCIDIUM PHACELIÆ, Peck, Bull. Torr. Club, xi. 50. Chicken Creek, at 9,500 feet, common on a *Phacelia*, n. 1068.

ÆCIDIUM PRENANTHIS, Pers. Syn. 208. La Plata River, at 9,500 feet, on *Helenium Hoopesii*, 16 July, n. 1075.

ÆCIDIUM SOMMERFELTII, Johans. Swampe Icl. 161. La Plata River, 9,000 feet, July 11, the host a *Thalictrum*, n. 1065.

ÆCIDIUM URTICÆ, Schum. Fl. Saell. ii. 223. At Mancos, on *Urtica gracilis*, 22 June, n. 41.

CÆOMA CONFLUENS (Pers.), Schrœt. Pilz. Schles. 376. La Plata River, 9,000 feet, 11 July, on *Ribes*, n. 1076.

CHRYSOMYXA PIROLÆ, Rostr. Mycol. Notiz. 126. Slide Rock Cañon, west of Mt. Hesperus, 11,000 feet, 2 July, on *Pirola*, n. 1040.

GYMONSPORANGIUM sp. No. 1079, on twigs of *Juniperus monosperma*, at Mancos, July 8, seems to be an undescribed species of this genus, but our specimens are all old and sterile. They form globular swellings an inch or more in diameter. Spots of an undeveloped *Rœstelia* were found near this, on leaves of *Amelanchier*.

GYMNOSPORANGIUM, sp. No. 1078, on twigs and branches of *Juniperus nana*, Bob Creek, 11,000 feet, July 5. This causes fusiform swellings of the limbs much like those formed by *G. clavipes*, but the spore-masses are different in shape and of a lighter color, and the spores lack the swollen pedicel characteristic of that species. It is probably new, but our specimens are not in a condition to insure correct diagnosis.

Gymnosporangium speciosum Peck? Bot. Gaz. iv. 217. On branches and trunks of *Juniperus monosperma*, Durango, 6,500 feet, July 20, n. 1079. This forms large fusiform, plicate swellings on the trunks or larger branches, frequently causing the death of the tree. The specimens were too old for positive identification.

Melampsora Lini (DC.), Tul. Ann. Sci. Nat. (1854) 93. On *Linum Lewisii*, Chicken Creek, 9,000 feet, July 7, n. 1039.

Phragmidium mucronatum (Pers.), Lk. Spec. Plant. ii. 84. At Hamor's Lake, north of Durango, 9,000 feet, July 24, on *Rosa*, n. 1062.

Phragmidium Rubi-ideæ (DC.), Winter? II. Die Pilze. 231. No. 1043, on *Rubus Nutkanus*, La Plata Cañon, 9,000 feet, July 11. Similar to the form of this species credited to this host, but the *Uredo* spores are larger, 20–28x15–20μ, and prominently reticulated, not echinulate. We found no teleutospores.

Puccinia aberrans Peck Bot. Gaz. iv. 217. No. 1050, on *Draba*, Bob Creek, 10,500 feet, July 1.

Puccinia acrophila Peck l. c. vi. 227. No. 1069, on *Synthyris Ritteriana*, Cumberland Mine, La Plata Mts., 12,000 feet, July 15.

Puccinia Balsamorrhizæ Peck, Bull. Torr. Club. xi. 49. No. 1036, on *Balsamorrhiza deltoidea*, Mancos, 7,000 feet, June 23.

Puccinia Calochorti Peck, Bot. Gaz. vi. 228. No. 1056, on *Calochortus Gunnisoni*, Mancos, 7,000 feet, July 9.

Puccinia Claytonianum (Schw.) N. Am. Fungi, No.

2892, p. 294. (*P. Mariæ-Wilsoni* Clinton). Cumberland Mine, La Plata Mts., 12,000 feet, July 15, on *Claytonia megarrhiza*, n. 1045.

Puccinia conglomerata (Str.), Schm. & Kze. Crypt. Exsic. No. 191. No. 1057, on *Senecio*, upper La Plata River, 10,000 feet, July 12. Not before reported from America, but the specimens agree closely with Sydow Uredineen, No. 461, and with published descriptions.

Puccinia fragilis Tracy & Galloway, Journ. Myc. iv. 20. No. 423 A, teleutospores, 423 B, æcidial stage, on *Arenaria* (?) sage plains west of Mancos, July 8. The generic identity of the host could not be determined with certainty. This seems to be the first collection of the æcidial stage of this fungus, and we give it the following description: Amphigenous but more abundant below; spots none; pseudoperidia scattered or clustered, cylindrical, length about equal breadth, border narrow, spreading, coarsely lacerate; spores subglobose, light colored, epispore thin, slightly roughened, 16–16x19μ.

Puccinia Gayophyti Billings, Bot. King Exp. 414. No. 1046, on *Gayophytum*, Parrott City, July 16. We find no published description of the Uredo stage of this species. Our specimens show the following characters: Amphigenous; sori small, round, scattered, yellowish; spores globose to oval, often somewhat angular, slightly echinulate, 14–16x12–14μ.

Puccinia Hieracii (Schum.) Mart. Fl. Mosq. 226. No. 72, on *Crepis*, Mancos, 7,000 feet, June 23. No. 57, on *Taraxacum officinale*, Mancos, June 23.

Puccinia Holwayii Diet, in Hedw. xxxii. 29. I and III

No. 1077, on *Allium*, Bob Creek, 10,500 feet, June 28. The æcidial stage of this species has not been described. We find the following characters: Amphigenous; spots yellow; pseudoperidia in irregular elongated clusters, nearly white, short cylindrical, border somewhat lacerate, cells irregularly polygonal, 25–30x15–20μ, walls thick, 3–4μ, roughened; spores light yellow, subglobose or oval, epispore thin, nearly or quite smooth, 20–22x16–18μ; spermagonia not seen.

Puccinia mirablissima Peck, Bot. Gaz. vi. 226. No. 1060, on *Berberis nana*, Greene, Mancos, June 23.

Puccinia Pimpinellæ (Strouss), Lk. Sp. Plant. ii. 77. No. 1064, on *Glycosma occidentalis*, Little Kate Mine, La Plata Mts., 11,500 feet, July 14.

Puccinia Prenanthis (Pers.) Fckl. Symb. 25. At Durango, on *Lactuca*, n. 1071.

Puccinia Tanaceti, DC. Fl. Fr. ii. 222. Little Kate Mine, La Plata Mts., 11,000 feet, on some Helianthaceous composite, 16 July, n. 1054.

Puccinia Tanaceti Actinellæ, Webber, Nebr. Rep. for 1889, p. 66. At Mancos, 23 June, on *Actinella leptoclada*, n. 74.

Puccinia Thalictri, Chev. Fl. Par. i. 417. At Mancos, 24 June, on *Thalictrum Fendleri*, n. 1066.

Puccinia Troximontis, Peck, Bot. Gaz. vi. 227. West Mancos Cañon, at 9,000 feet, 3 July, on *Agoseris*, n. 1074.

Uromyces Astragali (Opig.), Sacc. M. S. 208. At Mancos, 8 July, on *Astragalus*, n. 437.

Uromyces Eriogoni, Ell. & Harkn. Cal. Acad. 1884, p. g. (I only). Foothills, near Dix, 9,000 feet, 10 July, on *Eriogonum*, n. 1044.

Uromyces Euphorbiæ, C. & P. Rep. N. Y. Mus. xxx. 90. At Durango, on *Euphorbia*, n. 1042.

Uromyces Glycyrrhizæ (Rabh.) Magn. Ber. Deutsch. Gesell. 1890, p. 383. Durango, July 18, on *Glycyrrhiza, lepidota*, n. 1063.

Tremellaceæ.

Guepinia alpina n. sp. Cup-shaped, short-stipitate; disc orange yellow, about 6 mm (when dry), margin slightly involute; stipe 3mm, like the outside of the cup pruinose from thick standing, vessiculately swollen hairs, that are about 50x16μ, simple, or sometimes once septate and constricted, minutely roughened; hymenium of closely compacted cylindrical basidia filled with yellow granules, seemingly simple, but forking at base, about 40x3$\frac{1}{2}\mu$; spores oblong, continuous, about 12x4μ (immature). On decayed wood of *Picea Engelmanni*, in a snow bank, Slide Rock Cañon, 11,000 feet, July 2, n. 1109.

Guepinia monticola n. sp. Cup-shaped, ferrugineus, short-stipitate, thin, expanded when wet, involute when dry, 3–8 mm, exterior sulcate-ribbed, surface scarcely distinguishable to the naked eye from the hymenium, clothed with vessicular hairs 50μ long, with base globose, 20–25μ wide, abruptly contracted above into a long beak; hymenium of closely packed, cylindrical, yellowish basidia 40–50x3$\frac{1}{2}\mu$, forking near the upper end; spores cylindrical, slightly curved, continuous (?), guttulate, 12–16x4μ, on slender sterigmata about 10μ long. On sound, decorticated wood of *Picea Engelmanni*, Slide Rock Cañon, 10,500 feet, June 30, n. 241. Quite common.

Boletaceæ.

Boletus Bakeri n. sp. Pileus 10–20cm, regularly con-

vex, uniformly bright brick-red verging toward salmon, viscid, becoming somewhat dry and occasionally cracking areolately with age, flesh pure white, slowly changing to pinkish purple when cut; pores at first pure white stuffed and plain, becoming ventricose and tawny, turning purplish and then greenish blue when bruised, deeply sinuate; stem stout, enlarged below, tapering abruptly upward for the upper one-fourth, 3–4cm thick below, 1½–2cm above, 8–12cm high, solid, pure white within, externally white, but beset with upward pointing, brown tipped scales, usually smooth above. On the ground, common in moist aspen thickets. No. 355, Chicken Creek, 9,000 feet, July 6. Also seen on the upper La Plata at 10,000 feet. Some three dozen specimens of this magnificent *Boletus* were taken, but owing to constant showers, and lack of drying facilities, all but one were lost. Two other species of the genus were seen, but it was not possible to preserve them.

Polyporaceæ.

By L. M. Underwood.

Lenzites sepiaria, Fries, Epicr. 407. On logs of *Picea Engelmannii*, Bob Creek at 10,000 feet, 27 June, n. 797.

Merulius sp. On logs of *Picea Engelmannii* in Slide Rock Cañon, 30 June, n. 10,52. Probably new, but too old for satisfactory determination.

Polyporus adustus (Willd.), Fr. Syst. i. 363. Logs of *Populus tremuloides*, Bob Creek, 10,000 feet, 28 June, n. 778.

Polyporus pinicola, Fr. Eleuch. 105. Logs of *Picea Engelmannii*, La Plata Mts., July, n. 794 and 796.

Polyporus salicinus (Pers.), Fr. Syst. i. 376. On stand-

ing dead trunks of aspen, upper La Plata River at 10,000 feet, 13 July, n. 795.

Polyporus, sp. On logs of *Populus tremuloides*, La Plata Mts., June and July, n. 186 and 799. Perhaps new, but approximating some thick forms of *P. pergamenus*.

Polyporus Pini (Brot.), Fr. l. c. 336. On logs of *Picea Engelmannii*, La Plata Mts., July, n. 800.

Agaricaceæ.

Naucoria Coloradoensis n. sp. Pileus 3–6cm, convex, becoming expanded, slightly umbonate, tawny yellowish-brown, often darker on umbo, densely clothed with felted yellowish hairs, margin not striate, strongly incurved when young; veil arachnoid, soon evanescent; gills adnate, subcrowded, tawny-white, changing to dark-brown; spores oval, dark rusty-brown, usually with a large oval vacuole, about 10x6μ; stem 4–6cm high by 4–8mm thick, slightly bulbose below, colored and clothed like the pileus, but hairs closely appressed and less felted.

On moist shaded ground near the river at Mancos, June 21, n. 22.

Exoacaceæ.

Taphria cœrulescens (Mont.) Tul. Ann. Sci. Nat. 1866, p. 127. No. 32, on *Quercus undulata*, Mancos, 7,000 feet, June 22. Common in oak thickets on hillsides near the river.

Helotiaceæ.

Lachnum Engelmanni n. sp. (Trichopeziza). Scattered or gregarious, subsessile or short stipitate, 1–4mm in diameter, flat and expanded when wet, incurved when dry, exterior thickly clothed with dark fuscous, septate, rigid hairs, 200 or more by 5μ, becoming attenuate toward the

subhyaline tip; disc waxy, bright yellowish orange; asci 8-spored, clavate, obtuse, nearly sessile, about 50x6μ, exceeded by the numerous ascicular yellowish minutely guttulate sharp-pointed apophyses, these measuring about 60x2μ; ascospores monoetichous or partly distichous, hyaline, continuous, oval, about 6x4μ.

Very common on dead bark of *PiceaEnglemannii* at 10,500 feet in Bob Creek, 3 July, n. 1058.

Patellariaceæ.

Patinella Crandallii, Sacc. Syll. xi. 434. At Little Kate Mine, La Plata Mts., on dead stems of *Sieversia turbinata*, at 12,000 feet, 14 July, n. 1100. An elegant little species, often occurring, on the dead and dry calyxes of the preceding year, of the rosaceous host named.

Erysibaceæ.

Erysibe cichoracearum DC. Fl. Fr. ii. 274. No. 1081, on *Mertensia*, Mancos, June 23.

Erysibe graminis DC. l. c. vi. 106. No. 384, on *Poa nemoralis*, pine belt north of Mancos, 8,500 feet, July 7.

Hypocreales.

Charonectria Pedicularis n. sp. Scattered or subgregarious, perithecia prominent but long covered by the thin epidermis, orbicular, at length subdepressed, bright coral-red, smooth, soft, perforated by an obscure ostiolum, about 400μ; asci numerous, cylindrical, short-pedicellate, paraphysate, (?) about 100x8μ; ascospores obliquely monostichous, hyaline, minutely guttulate, equally uniseptate, narrowly oval, ends acutish, about 17x4μ.

On dead stems of *Pedicularis crenulata*, Bear Creek Divide,

11,000 feet, June 29, n. 230. This is a new genus to North America. Only three species have heretofore been described, one from Terra del Fuego and two from France.

Dothideaceæ.

Ropographus hysteriiformis (Karst) Sacc. Syll. ii. 648. On decorticated branches of *Picea Engelmannii*, Bob Creek, 10,500 feet, June 28, n. 202. This peculiar fungus has heretofore been found only in Northern Europe on decorticated wood of juniper and pine. Our specimens agree closely with published descriptions. We have not seen European specimens.

Sordariaceæ.

Hypocopra fimicola (Rob.) Sacc. l. c. i: 240. On cow dung, Bob Creek, 10,500 feet, July 2, n. 1105.

Sphæriaceæ.

Herpotrichia nigra Hartig Hedw. xxvii. 13. On living leaves of *Picea Engelmannii*, Bear Creek Divide, 11,000 feet, June 29, n. 232.

This has not before been reported from America. The asci soon vanish, and at full maturity the ascospores are fuliginous. In our specimens the perithecia often reach 5mm. In other respects it closely agrees with the description given by Hartig. It was also observed on Mt. Hesperus near timber line, but was not seen below 11,000 feet. This was previously collected by C. F. Baker on spruce in northern Colorado, July 13, 1896, at Cameron Pass, 10,000 feet, and distributed by him under the name of *Lasiosphæria Coulteri*, Peck. It closely resembles that pine-inhabiting species externally, but the spores are entirely different.

Rosellinia parasitica Ell. & Ev. Proc. Phil. Acad.

1890, p. 227. On dead branches of *Symphoricarpus*, Bob Creek, 10,500 feet, June 27, n. 1073. On the same twigs were also *Gibberidia Symphoricarpi*, *Tricosphæria Barbulæ* and *Strickeria Symphoracarpi* (B. & Br.) Winter, Pilze, ii. 206. On dead bark of *Picea Engelmannii*, Bear Creek Divide, 11,000 feet, June 29, n. 1082. It has previously been reported only on pine bark from Europe. Our specimens agree so closely with published descriptions, especially with that in Winter ii, that we so name them, but we have not seen European specimens.

Zignoella Potentillæ n. sp. Perithecia scattered, erumpent becoming superficial, black, depressed globose, roughened, ½mm in diameter; ostiolum conical; asci cylindrical or fusiform, short stipitate, 8 spored, 45–50x10–12μ; paraphyses filaform, longer than the asci; ascospores hyaline, oval or elliptical, faintly ¾-septate, 11–12x4–5μ.

On decorticated stems of *Potentilla fruticosa*, Bob Creek, 10,500 feet, July 3, n. 1039.

Cucurbitariaceæ.

Gibberidia Ribis n. sp. Perithecia loosely clustered on large blackened areas, erumpent-superficial, globose, black, ½mm in diameter, ostiolum short conical, roughened; asci numerous, short-stipitate, oblong or elliptical, 90–100x 12–14μ; ascospores fuliginous, elliptical, 5–7-septate, somewhat constricted at each septum, 28–32x6–7μ.

On decorticated wood of *Ribes*, at same station as the last. June 28, n. 1101.

Gibberidia (?) Symphoricarpi n. sp. Perithecia clustered, two or three to twelve or more forming more or less elongated pustules, these partially covered by the shredded epidermis, clothed with long, deflexed, strigose, occasionally

septate, fuscous hairs about 6μ in diameter, carbonaceous, not collapsing, ostiolum minutely papillate, inconspicuous, stromatic material black, scanty, perithecia nearly free, about $\frac{3}{4}$mm; asci cylindric-clavate, short stipitate, 80–100x14–16μ; paraphyses abundant, thread like; ascospores obliquely monostichous, oval, fuliginous, 3-septate, slightly constricted at each septum, often somewhat curved, 30–35x8–10μ.

On dead twigs of *Symphoricarpus*, Bob Creek, 10,500 feet, June 27, n. 173, with *Rosellinia parasitica* and *Strickeria Symphoricarpi*. The true generic position of this species is somewhat doubtful. Its scanty imperfect stroma suggests that it should be placed in the Cucurbitariaceæ rather than in *Mellogramma*, but the vestiture of the perithecia would exclude it from Gibberidia, as that genus is now defined. Since perithecial hairs are present in the nearly related Gibbera, from which our species is excluded by the spore characters, we prefer to widen the definition of *Gibberidia* rather than to propose a new genus based only on the presence of perithecial hairs.

Otthia Distegiæ n. sp. Densely cespitose in oval clusters of 4 or 5 to 20 or more, on a scanty subiculum of fuscous threads, breaking through the epidermis, black, rugose, collapsing, ostiolum minutely papillate inconspicuous, about $\frac{1}{4}$mm in diameter; asci 8-spored, clavate, substipitate, about 100x18μ; paraphyses thread-like abundant; ascospores obliquely monostichous or partly distichous, oval or ovate, often curved, light fuliginous, about equally uniseptate, somewhat constricted, about 25x8μ.

On dead twigs of *Distegia involucrata*, Mancos, June 25, in river bottoms, n. 1090.

Otthia (Otthiella) Ribis n. sp. Perithecia densely cespitose, erumpent, partially surrounded by the trans-

versely ruptured epidermis, black, rugose, globose, ¼ to ½mm in diameter; asci cylindrical, 8 spored, stipitate, 80–100 x12–15μ; ascospores distichous, elliptical, hyaline or slightly yellowish, uniseptate, constricted, 18–20x5–6μ.

On *Ribes*, Bob Creek, 10,500 feet, June 28, n. 1102.

AMPHISPHÆRIACEÆ.

AMPHISPHÆRIA JUNIPERI n. sp. Perithecia scattered, superficial, globose, carbonaceous, not collapsing, ostiolum short-papillate, about 6mm; asci clavate-cylindric, short stipitate, 100–120x20μ; paraphyses abundant thread-like; ascospores distichous, broadly fusiform, light fuliginous, uniseptate, constricted, usually with two large guttae in each cell, ends sub-acute, 30–35x10–12μ.

On the outer shredded bark of *Juniperus monosperma*, hills near Mancos, July 8, n. 780.

AMPHISPHÆRIA POPULI n. sp. Perithecia thickly scattered, small, globose, black, shining, not collapsing, obscurely perforate, base sunk in the whitened wood fibres, about 250–300μ; asci cylindrical, short stipitate, 80–90x8μ; paraphyses abundant thread-like; ascospores monostichous, oval or ovate, ends rounded, fuliginous, equally uniseptate, much constricted, about 12x6 .

Decorticated branches of *Populus angustifolia* at Mancos, June 21, n. 1103.

STRICKERIA INSECURA (Ell.) Tracy & Earle, (*Teichospora insecura*, E. & E. N. A. Pyr. 214). Dead twigs of Salix, Bob Creek, 10,500 feet, July 4, n. 1059.

STRICKERIA SYMPHORICARPI n sp. (*Teichospora* Fckl.) Perithecia scattered or somewhat clustered on irregular blackened areas, large, ½ to 1mm, black, carbonaceus, globose, rugose, not collapsing, ostiolum minutely papillate, in-

conspicuous; asci cylindrical, short stipitate, 150–200x16μ; paraphyses abundant, delicate, thread-like; ascospores monostichous, broadly oval, at first yellow 1-septate and much constricted, becoming dark fuscous and 3-, 5- and finally 7-septate, the middle, but not the comparatively large end cells, longitudinally divided, constricted only at the middle septum, about 25x12μ.

Dead bark or decorticated twigs of *Symphoricarpus*, Bob Creek, 10,500 feet, June 27, with nos. 173 and 1073, n. 1076. The size and septation of the spore is much as is in *Teichospora strigosa* E. & E. on the same host.

Tramatosphæria Juniperi n. sp. Perithecia scattered, subfree, suborbicular, black, carbonaceous, not collapsing, $\frac{1}{2}$mm or more in diameter, ostiolum tuberculate, prominent, black, shining; asci clavate, short-stipitate, soon evanescent, about 100x10μ; paraphyses abundant, threadlike, guttulate; ascospores obliquely monostichous or subdistichous, fuliginous, obtuse-fusiform or subcylindric, often curved, 5–7-septate, somewhat constricted especially at the middle septum, 30–35x6–8μ.

On weather-worn wood of *Juniperus monosperma*, foot hills near Mancos, July 8, n. 1093.

Lophiostomataceæ.

Lophiostoma occidentalis n. sp. Perithecia scattered, prominent, black, roughened below smooth above, oval, 1–1$\frac{1}{2}$x$\frac{3}{4}$–1mm, ostiolum compressed; asci clavate-cylindric, stipe long and slender, 150–160x20μ; paraphyses long filiform; ascospores elliptical, rounded above, more slender below, fuscous, becoming opaque, 5-septate, 30–40x10–15μ, when immature with a large vacuole in each cell.

On barkless branches of *Juniperus monosperma*, Mancos, June 24, n. 1111.

PLATYSTOMUM ACERIS n. sp. (*Lophidium* Sacc.) Perithecia scattered, black, rough, compressed, ¾–1x½–¾mm, ostiolum depressed, elliptical; asci oblong, stipitate, 100–120x14–16μ; paraphyses numerous filiform; ascospores obliquely monostichous, oval, 3-septate, deeply constricted at the middle septum, muriform, dark brown, 17–18x9–10μ.

Dry decorticated twigs of *Acer glabrum*, upper La Plata River, 10,000 feet, July 13, n. 1107.

PLATYSTOMUM ALPINUM n. sp. (*Lophidium* Sacc.). Perithecia widely scattered over considerable areas, becoming subsuperficial, black, rough, hemispherical or slightly oval, ¾x1mm, ostiolum obscurely papillate, inconspicuous, slightly elongated; asci cylindrical, short-stipitate, 140–160x12–14μ; paraphyses numerous, filiform; ascospores obliquely monostichous, broadly elliptical or ovate, brown becoming opake, 5-septate, sharply constricted at the middle, central cells with long longitudinal septa, 20–22x8–10μ.

Dead barkless wood of *Populus tremuloides*, Bob Creek, 10,500 feet, June 27, n. 170. The asci and spores are much as in *Lophidium trifidum* E. & E., but the gross characters are very different.

PLATYSTOMUM AMELANCHIERIS n. sp. Perithecia scattered, deep seated, black, rough below shining above, nearly hemispherical, ½–1mm, ostiolum inconspicuous, often irregularly elongated; asci cylindrical, stipitate, 140–150x13–15μ; ascospores obliquely monostichous, fuscous, becoming opaque elliptical with usually acute ends, 3–5-septate, muriform, slightly or not constricted, 22–24x7–8μ.

On decorticated branches of *Amelanchier* at Mancos, June 23, n. 1110.

PLATYSTOMUM DESERTORUM n. sp. Perithecia scattered, subsuperficial, black, rough, usually hemispherical but some-

times oval, ½mm in diameter, ostiolum elliptical or nearly circular; asci cylindrical, long stipitate, 135–150x11–13μ; paraphyses very numerous, filiform, much longer than the asci; ascospores obliquely monostichous, oval, dark-brown, 5–7-septate, much constricted at the middle septum, muriform, 22–24x8–9μ.

No. 1108, on dead stems of "Sage Brush" (*Artemisia*, sp. ?), Mancos, June 24.

MYCOSPHÆRELLACEÆ.

MYCOSPHÆRELLA COERULEA (E. & E.) Tracy & Earle. (*Sphærella coerulea*, E. & E. Proc. Phil. Acad. 1894, n. 334.) Dead stems of *Aquilegia coerulea*, Bob Creek, at 10,500 feet, n. 1116. The dimensions are somewhat larger than those given in the description, and the spores are decidedly yellowish. We find the perithecia 120–140μ, asci ovate, 65–75x20μ, and ascospores 25x5μ.

MICOSPHÆRELLA FENDLERI n. sp. (*Sphærella*). Perithecia minute, scattered, solitary, at first covered by the cuticle becoming slightly erumpent; asci oblong, short-stipitate, 40–45x10–12μ; paraphyses none; ascospores fusiform, obtuse, uniseptate, hyaline, slightly constricted, 15–17x3.5–4μ.

On dead stems of *Thalictrum Fendleri*, Bob Creek, 10,500 feet, June 28, n. 1091.

MYCOSPHÆRELLA GLYCOSOMÆ n. sp. (*Sphærella*). Spots none; perithecia thickly scattered over large areas, black, spherical, firm not collapsing, about 100μ; asci sessile, broadly obovate, obtuse, aparaphysate, 8 spored, about 50x 10μ; ascospores inordinate, narrowly ovate, larger end obtuse, smaller end subacute, about equally uniseptate hyaline, guttulate, about 16x5μ.

Dead weather-worn stems of *Glycosoma occidentalis*. Same station and date with the last, n. 1047.

Mycosphærella Iridis (Aud.) Schrœt. (*Sphærella*) in Engl. & Prantl. i. 425. On dead leaves and stems of *Iris Missouriensis*, Chicken Creek, 9,000 feet. July 7, n. 1096.

Mycosphærella Tassiana (DeNot.). Johans. in Engl. & Prantl. Slide Rock Cañon, 11,000 feet, July 2, on *Festuca*, n. 1098.

Pleosporaceæ.

Ophiobolus Castilleiæ n. sp. Spots none; perithecia scattered, finally erumpent, black, 200–250μ; asci clavate, short-stipitate, 90–120x12μ; paraphyses flexuous, thread-like; ascospores yellowish brown, guttulate, 50–55x5μ, nearly straight in the ascus.

On dead stems of *Castilleia confusa*, Greene, Mt. Hesperus, 10,000 feet. June 30. Also common on Bob Creek, n. 1095.

Ophiobolus Festucæ n. sp. Spots black, 1mm long, mostly on the upper half of the leaf; perithecia immersed, finally rupturing the epidermis, 200–250μ; asci broadly clavate, short-stipitate, 110–130x20–25μ; paraphyses numerous, coiled at the apex; ascospores very slender fusiform, guttulate, 40–50x3–4μ.

No. 361, on dead leaves of *Festuca*, Chicken Creek, 9,500 feet, July 6.

Pleospora Balsamorrhizæ n. sp. Perithecia scattered, at length partially erumpent, somewhat fibrillose below, glabrous and depressed above, 300–400μ, ostiolum short, conical; asci 4–8, broadly clavate or obovate, 200–250x 70–80μ; ascospores 8, inordinate, each surrounded by a yellow gelatinous coat, 7-septate, constricted at each septum, but more deeply at the center, each cell 2–4 times vertically divided, quite variable in size, in the same perithecium from 60x28μ to 38x16μ, averaging 45x22μ.

No. 1097, on dead stems of *Balsamorrhiza deltoidea*, Mancos, June 24.

Pleospora herbarum (Pers.) Rabh. Herb. Myc., 547. On dead stems of a *Vicia*, n. 1092. La Plata River, 9,500 feet, July 11.

Pleospora megalotheca n. sp. Perithecia scattered, erumpent, glabrous, depressed-globose, ostiolum short, conical; asci 15–20, oblong, rather long-stipitate, very thick walled, 8-spored, 200–250x40–45μ; ascospores obliquely monostichous or distichous, ovate, yellowish-brown, becoming opaque, 11–13 septate, the cells with 2–3 longitudinal septa, 40–45x16–20μ.

No. 172. On dead stems of *Achillea millefolium*, Bob Creek, 10,500 feet, June 27, n. 172.

Valsaceæ.

Valsa boreella Karst. Myc. Fenn., ii. 141. On dead branches of *Salix*, upper La Plata River, 10,000 feet, July 13, n. 1117.

Mucedinaceæ.

Monilia Cerasi n. sp. Covering the entire fruit with a white coating, which becomes ash-colored with age; fertile hyphae very short, ascending, hyaline, widely branching; conidia often as many as 10 or 12-catenulate, hyaline, lemon-shaped, 10–12 x 8–10μ.

On immature fruit of *Cerasus* (wild cherry), Parrott City, July 11, n. 1083.

Ovularia compacta Ell. & Ev. Journ. Myc., v. 68. On living leaves of *Agoseris*, Chicken Creek, 9,000 feet, July 6, n. 353.

Ovularia sphæroidea Sacc. Mich. i. 130. On living

leaves of *Lupinus*, Chicken Creek, 9,000 feet, July 6, n. 368.

Ramularia Crepidis, Ell. & Ev. Jour. Myc. iv:46. On living leaves of *Agoseris*, Mt. Hesperus, 10,000 feet, June 30, n. 1088.

Tuberculariacæ.

Exosporium Sambuci, n. sp. Sporodochia scattered, finally rupturing the epidermis longitudinally, sometimes confluent in lines 1cm long, usually convex and irregularly tuberculate; sporophores 5–6μ in diameter, septate, yellowish, often deciduous remaining attached to the conidium; conidia oval or obovate, brownish yellow, 3-septate, not constricted, 40–44x17–20μ.

On dead twigs of *Sambucus melanocarpa*, upper La Plata River, 10,000 feet, July 13, n. 1104.

Sphæroidaceæ.

Diplodina Fraseræ (Ell. & Ev.), Tracy & Earle, Bull. Torr. Club, xxiv. 289. (*Ascochyta Fraseræ*, Ell. & Ev). No. 171, on dead stems of *Frasera*, Bob Creek, 10,500 feet, June 27. Common. Our specimens agree with the amended description given by Ellis & Everhart, Bull. Torr. Club, xxiv. 464. The habitat on dead stems, and the spherical black carbonaceous perithecia determine it to be a *Diplodina* rather than an *Ascochyta*.

Phoma delphiniicola n. sp. Perithecia scattered, or sometimes two or three together under the whitened epidermis, black, large, $\frac{1}{3}$ to $\frac{1}{2}$mm, partially collapsing, at length somewhat erumpent, often bordered by a narrow brown stain; sporules cylindrical, minutely guttulate, 8–10x2μ.

Dead stems of *Delphinium*. Bob Creek, 10,500 feet, June

28, n. 1094, and on dead stems of *Aconitum Columbianum*, Bear Creek Divide, 11,000 feet, June 29, n. 231.

PHOMA INULINA Sacc. Mich. ii. 91. On dead stems of *Pyrrocoma crocea*, Bob Creek, 10,500 feet, June 28, n. 204.

PHOMA SCEPTRI Karst. Hedw. xxiii. 159. Dead stems of *Pedicularis*, Bob Creek, June 27, n. 1106.

SEPTORIA OSMORRHIZÆ Peck, Rep. N. Y. Mus. XXXIX. 46. Leaves of *Glycosoma occidentalis*, Bob Creek, 10,500 feet, July 3, n. 1038. Abundant, mostly infesting the lower leaves; agreeing well with eastern specimens, see Ellis n. 3137.

CHARACEÆ.

CHARA CONTRARIA, A. Br. In Hamor's Lake, near Durango, n. 1115.

LICHENES.

Determined by Prof. BRUCE FINK.

BIATORA DECIPIENS, Fr. On dry open ground, Bear Creek Divide, at 11,000 feet, n. 232.

BIATORA SANGUINEVATRA, Tuckerm. Moist ground in spruce woods, Slide Rock Cañon, 11,000 feet, n. 286.

BUELLIA PARASEMA, Th. Fr. Near Mancos, on dead branches of *Juniperus monosperma*, n. 785.

CLADONIA FIMBRIATA, Fr. On a decaying log, Bob Creek, 10,000 feet, n. 779.

CLADONIA PYXIDATA, Fr. Moist ground on Bob Creek, 10,000 feet, n. 201.

CLADONIA SYMPHYCARPA, Fr. Terrestrial in spruce woods, Bear Creek Divide, 11,000 feet, n. 337.

LECANORA PACIFICA, Tuckerm. Mancos; n. 789 on dead

branches of juniper; n. 790 on bark of *Populus angustifolia.* Prof. Fink remarks, concerning the specimens that "They are more pruinose than other herbarium specimens, and the locality is new."

PANNARIA LEPIDOTA, Fr. On dry ground, Mt. Hesperus, 11,000 feet, n. 1114.

PARMELIA CONSPERSA, Ach. Rocks on Bob Creek, 10,500 feet, n. 1113.

PELTIGERA CANINA, Hoffm. Moist ground in Slide Rock Cañon, n. 242.

PERTUSARIA COMMUNIS, DC. At Mancos, on dead branches of juniper, n. 784.

PHYSCIA STELLARIS, Tuckerm. Habitat, etc., same as the last, n. 788.

PLACODIUM AURANTIACUM, Næg. & Hepp. On juniper; n. 793 on the bark; n. 783 on dead wood of same, all in the vicinity of Mancos.

PLACODIUM CERINUM, Næg. & Hepp. At Mancos, on bark of *Populus angustifolia*; n. 792.

RHINODINA SOPHODES, Nyl. At Mancos on juniper, n. 786.

THELOCHISTES POLYCARPUS (Ehrh.) At Mancos, on living bark of *Populus angustifolia*, n. 791, on *Atriplex*? n. 781. At Bob Creek on dead twigs of *Picea Engelmannii*, n. 203.

USNEA CAVERNOSA, Tuckerm. At 10,000 feet on the upper La Plata, n. 778.

FILICES.[1]

CRYPTOGRAMMA ACROSTICHIOIDES, R. Br. App. Frank.

[1] The reports on mosses and hepatics of this collection will appear elsewhere later. E. L. G.

Journ. 767. In clefts of dry rocks on Mt. Hesperus, at 11,000 feet, also in like situations on the upper La Plata, but nowhere common, n. 245.

CYSTOPTERIS FRAGILIS, Bernh. Schrad. Journ. Bot. i, part 2, 27. Rather common on moist cliffs of the upper La Plata and elsewhere, at about 10,000 feet, n. 988.

EQUISETACEÆ.

EQUISETUM ARVENSE, Linn. Sp. 1061. On Bob Creek at 10,000 feet and frequent along alpine or subalpine cold streamlets, n. 989.

EQUISETUM PYEMALE, Linn. l. c. Common in wet meadows at Mancos; also seen at Trimble Springs, n. 103.

EQUISETUM ————, No. 1129, a few plants only, in a wet meadow at Mancos, not well in fruit.

CONIFERÆ.

PINUS EDULIS, Engelm. Wislizenu's Rep. 88. Mancos, at about 7,200 feet, constituting along with *Juniperus monosperma*, the low sparse woodland growth of the first foothills, n. 93.

PINUS PONDEROSA SCOPULORUM, Engelm. in Bot. Calif. ii. 126. This common pine of the Rocky Mountains is said by the collectors to begin on the hills north of Mancos, at an elevation of about 8,000 feet, and to mark its own distinct floral belt or zone lying between that of the piñon and cedar belt below, and of the aspen-spruce zone above, the former beginning at about 7,500 feet, the latter at approximately 9,000 feet. The species is the only timber pine of the region, n. 376.

Picea Engelmannii (Parry) Engelm. Trans. St. L. Acad. ii. 212. This is the common spruce of the country, constituting the principal timber growth at from 10,000 to 11,500 feet, this last elevation marking almost the limit of trees. The specimens are from Bob Creek, at 10,500 feet, n. 320.

Pseudotsuga taxifolia, Britton, in Trans. N. Y. Acad. viii. 74. Tree chiefly confined to the precipitous sides of deep cañons within the pine belt. The specimens are from 8,000 feet, in the West Mancos Cañon, n. 387.

Abies concolor, Parry in Am. Nat. ix. 204. A large but rather scarce tree, with light-gray trunk; specimens from Bob Creek, La Plata Mts., at 10,500 feet, n. 22.

Juniperus nana, Willd. Sp. iv. 854. A dwarf, sometimes almost trailing shrub of the higher mountains; the specimens from some 10,500 feet along Bob Creek, n. 335.

Juniperus monosperma, Sargent. The red cedar of the foothills, ranging between 6,500 and 7,500 feet, associated with *Pinus edulis*. The specimens are from Mancos, and were distributed as *J. occidentalis*, Hook., n. 77.

Juniperus scopulorum, Sargent, Gard. & Forest, x. 420. In the vicinity of Durango, but rather rare; only a few small trees seen, and these associated with *J. monosperma*, for which it was mistaken in making the distribution, n. 484.

Gnetaceæ.

Ephedra ————. Sterile branches only, the species hardly determinable. Mancos, said to be frequent in low foothills, n. 397.

Typhaceæ.

Typha latifolia, Linn. Sp. 971. A few plants in a small pond at Bob Creek, the altitude about 10,000 feet.

NAIADACEÆ.

POTAMOGETON PECTINATUS, Linn. Sp. 127. Hamors' Lake, north of Durango, 24 July, n. 499.

TRIGLOCHIN PALUSTRE, Linn. Sp. 338. Hamors' Lake, 24 July, n. 501.

TRIGLOCHIN MARITIMUM, Linn. Sp.339. Trimble Springs, near Durango, 26 July, n. 476.

ALISMACEÆ.

ALISMA PLANTAGO AQUATICA, Linn. Sp. 342. Lower La Plata Cañon, 11 July. Specimens poor, just beginning to flower, n. 1127.

GRAMINEÆ.

By S. M. Tracy.[1]

PANICUM VIRGATUM, Linn. Sp. 59. Occasional on railway embankment near Trimble Springs, Colo., n. 962. The only *Panicum* seen on the expedition.

PHALARIS ARUNDINACEA, Linn. l. c. 55. Abundant along Hamors' Lake, and occasional in wet places near Trimble Springs, n. 918.

ARISTIDA PURPUREA, Nutt. Trans. Am. Phil. Soc. v. 145. On dry hills about Durango, n. 974.

A. PURPUREA HOOKERI. With the type, but also at lower altitudes, n. 973.

STIPA COMATA, Tr. & Rupr. Mem. Acad. Petr. Ser. 6, vol. v. 75. Rocky slopes in West Mancos Cañon, 7,000 to 9,000 feet, n. 358.

STIPA NELSONII, Scrib. Bull. Dep. Agr. xi. West Mancos Cañon, and also at Poncho Pass, n. 954.

[1] Done by Dr. Tracy in 1899; amended and brought to date by E. L. Greene, January, 1901.

Oryzopsis micrantha, Thurb. in Porter Fl. Colo. 145. On dry hills about Durango and on Chicken Creek, n. 961.

Orizopsis cuspidata, Vasey, Gram. U. S. 23. Common on sage plains, and on dry hills below 8,000 feet, n. 436.

Phleum pratense, Linn. l. c. 59. Commonly naturalized in fields and by waysides, n. 430.

Phleum alpinum, Linn. l. c. Common inhabitant of mountain meadows at 9,000 to 10,500 feet, n. 972.

Alopecurus aristulatus, Michx. Fl. i. 43. By streams, up to 10,500 feet, n. 972.

Sporobolus brevifolius (Nutt.), Scribn. Occasional in dry fields at Mancos and Durango, ascending to 9,000 feet in the mountains, nn. 325, 425.

Sporobolus airoides, Torr. Marcy's Rep. 300. Common in adobe soils about Mancos, Parrott City and Durango, and also at higher elevations, below 9,000 feet, n. 398.

Sporobolus asperifolius, Nees & Meyen, in Nov. Act. Nat. Cur. xix. Suppl. I, 141. Occasional along the Las Animas near Durango, n. 964.

Agrostis exarata, Trin. Gram. Unifl. 205. With the last, but not common, n. 950.

Agrostis hyemalis, BSP. Catal. 68. Common along streams and ditches below 10,000 feet, n. 951.

Calamagrostis hyperborea, Lange in Fl. Dan. t. 2942. Muddy banks about Hamor's Lake, n. 951.

Calamagrostis hyperborea Americana, Kearney, Bull. Agrost. xi. 41. On Panther Creek, near Durango, n. 967; rare.

Deschampsia cæspitosa, Beauv. Agrost. 91, t. 18, f. 3.

Common along the La Plata; very luxuriant in wet meadows near Hamor's Lake, n. 982; a peculiar dwarf from (n. 983) near Little Kate Mine, 11,500 feet.

TRISETUM SUBSPICATUM, Beauv. l. c. 88. Abundant in the cañon of the upper La Plata, and on hills about Hamor's Lake up to 12,000 feet, nn. 955, 957. The variety MOLLE, much dwarfed, only 5–7 inches high at 12,000 feet and upwards, n. 956.

AVENA STRIATA, Michx. Fl. i. 72. Little Kate Mine, at 10,000–11,000 feet; not common, n. 976.

DANTHONIA PARRYI, Scribn. Abundant in the pine belt along Chicken Creek, 8,500–8,900 feet, but not seen elsewhere, n. 349.

BOUTELOUA OLIGOSTACHYA, Torr. in Gray Man., 2 ed., 553. Occasional near Durango, and on the plains west of Mancos, n. 971.

BOUTELOUA CURTIPENDULA, Torr., Emory's Rep. 153. Dry gravelly soil along the La Plata and Las Animas Rivers, n. 970.

BECKMANNIA ERUCÆFORMIS, Host. Gram. Austr. iii. 5. Rather common in wet places at Durango and Trimble Springs, n. 959.

KŒLERIA CRISTATA, Pers. Syn. i. 97. One of the commonest grasses up to about 9,000 feet; rare above that; extremely variable as to length of leaf, nn. 99, 114, 324.

MELICA PARVIFLORA, Scribn. Mem. Torr. Club, v. 50. On shaded rocks, in the cañon of the La Plata, at 9,500 feet, rare, n. 969.

DACTYLIS GLOMERATA, Linn. Sp. 71. Along roadsides here and there; barely naturalized, n. 960.

Poa annua, Linn. Sp. 68. Observed only in a field near Hamor's Lake, n. 940.

Poa laxa, Hænke in Jirasek, Beob. 118. Summit of Mt. Hayden, 13,000 feet, n. 938.

Poa alpina, Linn. Sp. 67. Rare below 9,000 feet, common at higher elevations, very strong and luxuriant near Little Kate Mine, 11,000 feet, but becoming much dwarfed above 12,000 feet, nn. 925, 928, 929.

Poa cenisia, All. Auct. 40. Only at summit of the divide above Cumberland Mine, 12,000 feet, n. 933.

Poa pratensis, Linn. Sp. 67. Abundant below 9,000 feet, and variable. A form from the La Plata Cañon, near the upper limit of the species, has a very close panicle, with glaucous glumes; while another, from dry gravelly soil about Parrott City, has the panicle short and still more slender, and the glumes dark-purple, nn, 930, 932.

Poa nemoralis, Linn. Sp. 69. Occasional on dry banks, 9,000–11,000 feet, n. 935.

Poa arida, Vasey, U. S. Herb. i. 270. Occasional at Mancos, 7,000 feet, and in La Plata Cañon, 9,500 feet, n. 327.

Poa Buckleyana, Nash, Bull. Torr. Club, xxii. 465. On dry hills, 7,000–9,500 feet; rather rare, n. 110.

Poa longipedunculata, Scribn. Bull. Agrost. xi. 54. A characteristic species of the region of the West Mancos and its tributaries at from 9,000 to 10,000 feet altitude; not seen above 11,000 feet, or on the easterly slope of the mountains, nn. 138, 160, 194, 326.

Poa lucida, Vasey, U. S. Herb. 274. Common about Mancos in dry soil; also a peculiar form, with very hairy

glumes, in the La Plata Cañon, this at about 9,000 feet, nn. 434, 937.

Poa occidentalis, Vasey, l. c. Occasional along Bob Creek, 10,000–11,000 feet, n. 317.

Poa Grayana, Vasey, l. c. 272. In meadows near the limit of trees on Mt. Hesperus, n. 266.74.

Poa Fendleriana, Vasey, Bull. Dept. Agric, xiii. Occasional at 10,000–11,000 feet on the western slope of Mt. Hesperus, n. 262.

Poa epilis, Scribn. Circ. ix. 5. Abundant about Little Kate Mine, 11,500 feet, n. 934.

Poa rupestris, Vasey. On both eastern and western slopes of Mt. Hesperus, at about the limit of trees, n. 932.

Poa leptocoma, Scribn. Common along the upper La Plata at 9,000 to 11,500 feet. A very slender form with widely divergent-branched panicles occurs at about 11,000 feet near the Little Kate Mine, nn. 347, 926, 927.

Panicularia nervata, Kuntze, Rev. Gen. 783. Along streams and irrigating ditches in abundance, n. 953.

Panicularia pauciflora, Kuntze, l. c. In a bog near Bob Creek, 10,000 feet, n. 279.

Panicularia ———. No. 281; in bog with the last.

Puccinellia distans, Parl. Fl. Ital. i. 367. Along the Las Animas near Durango; rare, n. 963.

Festuca rubra, Linn. Sp. 74. Rather common along the sides of the La Plata Cañyon, 9,000–12,000 feet, nn. 920, 921.

Festuca ovina, Linn. l. c. 73. Very common in mountain meadows, n. 334. The Alpine variety brevifolia

abundant in large tufts above Cumberland Mine at 12,300 feet, n. 965.

Festuca scrabella, Torr. in Hook, Fl. ii. 252. The most common species of the genus; found everywhere between 7,500 and 10,500 feet, n. 443.

Festuca elatior, Linn. l. c. 75. In a field near Trimble Springs; doubtless introduced, n. 919.

Festuca Vaseyana, Hack. In open woods along the West Mancos River, 9,000–10,000 feet, n. 328.

Festuca Thurberi, Vasey in Wheeler's Rep. 292. Very plentiful on the hills upon Chicken Creek and the La Plata, 9,000–10,000 feet, nn. 344, 356.

Bromus ciliatus, Linn. Sp. 76. The common species at 7,000–10,000 feet, along watercourses; very rank forms occurring in higher altitudes, nn. 332, 987. The var. montanus, Vasey, at from 7,000 to 9,000 feet, and mostly near the summits of the ridges rather than by streams, n. 382. Also var. minor, Munro, on dry hills near Durango, not common, n. 986.

Bromus breviaristatus, Buckl. Proc. Philad. Acad. for 1862, 98. Characteristic species of the pine belt and variable. A smooth form with strict panicle occurs near Dix, while an opposite extreme, with widely open panicle and weak drooping pedicels was obtained at Trimble Springs, nn. 333, 984, 985.

Bromus Porteri, Nash, Bull. Torr. Club, xxii. 512. In the pine belt above Mancos, and at Parrott City, 8,000–9,000 feet, n. 432.

Agropyrum violaceum, Vasey, Gram. U. S. 45. Occasional along Chicken Creek at about 9,000 feet, but not elsewhere noticed; n. 949.

AGROPYRUM TENERUM, Vasey, Bot. Gaz. x. 258. Common in dry land below 9,000 feet; also a very slender and short-awned form at Trimble Springs and at Poncho Pass, nn. 111, 948.

AGROPYRUM CANINUM, Beauv. Agrost. 102. Common on the plains about Mancos and among the foothills; seldom occuring at elevation greater than 9,000 feet. Among the more notable deviations from the type is one with very pubescent sheaths, this from the Cañon of the La Plata; and there is one from Mancos with rigidly divergent leaves; nn. 431, 440, 977.

AGROPYRUM PSEUDO-REPENS, S. & S. On hills near Durango; not seen elsewhere, n. 946.

AGROPYRUM SCRIBNERI, Vasey, Bull. Torr. Club, x. 128. Abundant on the divide above Cumberland Mine, at 12,000–12,300 feet, n. 978.

HORDEUM PUSILLUM, Nutt. Gen. i. 87. Occasional in dry fields about Mancos and Durango.

HORDEUM ADSCENDENS, HBK. Nov. Gen. et. Sp. i. 180. Abundant on dry land above the river at Mancos; not before known as occurring within the United States except along irrigating ditches at Glendale, Arizona, n. 109.

ELYMUS CANADENSIS, Linn. Sp. 83. Occasional along the Las Animas, n. 980.

ELYMUS GLAUCUS, Buckl. Proc. Philad. Acad. (1862) 99. A state of this species showing compound spikes; found only at Hamor's Lake, n. 981.

ELYMUS MACOUNII, Vasey, Bull. Torr. Club, xiii. 119. Hills near Durango; seemingly rare, n. 979.

SITANION BREVIFOLIUM, J. G. Smith, Bull. Agrost. xviii.

17, t. 3. Abundant on dry sterile soil about Hamor's Lake, n. 4274; Mancos, n. 429; Durango, n. 4272.

Hilaria Jamesii, Benth. in Journ. Linn. Soc. xix. 62. Common in the plains about Mancos, and on dry hills near Durango, n. 427.

Cyperaceæ.

Carex alpina, Swartz. Upper La Plata River, 10,000 feet, July 13, n. 726.

Carex atrata, Linn. Mt. Hesperus, 11,500 feet, June 30; n. 261; Little Kate Mine, La Plata Mts., 11,000 feet, July 13, a large form; n. 709; Mt. Hesperus, 11,500 feet, July 2, a small form; n. 736; Mt. Hesperus, 10,000 feet, June 30, an unusual form approaching the var. discolor, n. 244.

Carex atrata discolor Bailey? Upper La Plata, 10,000 feet, July 13, n. 725; also observed near Bob Creek.

Carex aurea, Nutt. Mancos, 7,000 feet, July 8. A small form common in swampy river bottoms, n. 721; also in West Mancos Cañon, 9,000 feet, a much larger plant, n. 330.

Carex canescens, Linn. Bob Creek, La Plata Mts., 10,500 feet, July 3, common in bogs, n. 693.

Carex capillaris, Linn. West Mancos Cañon, July 4, n. 329.

Carex deflexa Farwellii, Britton. Little Kate Mine, 11,500 feet, July 14, n. 685.

Carex Douglasii, Boott. La Plata River, 9,000 feet. July 11, n. 697.

Carex festiva, Dewey. With the last. n. 699.

Carex festiva pachystachya, Bailey. Bob Creek, 10,500 feet, June 28, n. 731.

Carex fœtida, All? Little Kate Mine, 11,500 feet. July 14, n. 708.

Carex Geyeri, Boott. Bob Creek, 10,500 feet, July 1, n. 700. A common and characteristic plant of the dryer ridges and meadows.

Carex Hookeriana, Dewey. Dry meadows at Dix, 10 July, n. 701.

Carex Kelloggii, W. Boott. Bob Creek, 10,500 feet, June 28, n. 191.

Carex lanuginosa, Michx. Durango, 6,500 feet, July 26, n. 707.

Carex lupulina, Muhl. With the last, n. 706.

Carex marcida, Boott. Same place and date, n. 712.

Carex monile, Tuckerm. Hamor's Lake, 9,000 feet, July 24, n. 719.

Carex nova, Bailey. Upper La Plata, 10,000 feet, July 13, n. 702.

Carex obtusata, Lilje. Chicken Creek, 9,500 feet, July 6, n. 352.

Carex occidentalis, Bailey. La Plata River, 9,000 feet, July 12, n. 722. Mt. Hesperus, 10,000 feet, June 30, n. 264.

Carex Preslii, Steud. La Plata River, 10,000 feet, July 13, n. 724.

Carex rostrata, Stokes. Hamor's Lake, July 24, n. 705.

Carex rupestris, All. Cumberland Mine, 12,300 feet, July 15, n. 739.

Carex siccata, Dewey. La Plata River, 10,000 feet, July 12, n. 730.

Carex straminiformis, Bailey. West Mancos Cañon, 9,500 feet, July 4, n. 322.

Carex tenella, Schk. Bob Creek, 10,500 feet, June 28, n. 193.

Carex teretiuscula, Gooden. Hamor's Lake, July 24, n. 717.

Carex utriculata, Boott. Bob Creek, 10,000 feet, July 1, in a bog, n. 280.

Carex viridula, Michx. Hamor's Lake, July 24, n. 713.

Eriophorum polystachyum, Linn. With the last, n. 483.

Juncaceæ.

Juncus Balticus, Willd. Berl. Mag. iii. 298. About Mancos, 7,000 feet, 8 July, n. 438.

Juncus longistylis, Torr. Bot. Mex. Bound. 223. At Trimble Springs north of Durango, 26 July, n. 599.

Juncus nodosus, Linn. Sp. 2 ed. 466. Same station and date, n. 704.

Juncus Mertensianus, Bong. Veg. Sitch. 167. On the upper La Plata, at 10,000 feet, 13 July, n. 661.

Juncus tenuis, Willd. Sp. ii. 214. Common on the lower sage plains about Mancos, 8 July, n. 424. The variety congestus on Chicken Creek at 9,000 feet, 7 July, n. 742.

Juncus xiphioides, E. Mey. Syn. Junc. On the upper La Plata at 9,000 feet, 11 July, n. 741.

Luzula parviflora, Desv. Journ. Bot. i. 144. At Little Kate Mine, La Plata Mts.; very common along streamlets at 11,000 feet; 14 July, n. 740.

LUZULA SPICATA, DC. Fl. Fr. iii. 161. Cumberland Mine, La Plata Mts., at 12,300 feet, 15 July, n. 738.

MELANTHACEÆ.

ZYGADENUS DILATATUS. Two feet high or more, the rather copious foliage mostly a foot long, oblanceolate, tapering to an elongated petiolar basal portion, the dilated upper parts nearly acutish, the leaf as a whole but indistinctly and finely nervose; bracts of the raceme scarious, lanceolate, about equalling the pedicels or shorter; segments of the perianth oval, obtuse, scarcely unguiculate, faintly striate, mainly white; the green nectariferous spot at base broad and retuse, scarcely obcordate.

Little Kate Mine, La Plata Mountains, 13 July, 1898. Plant pale and glaucesant, this and its loose rather few-flowered raceme indicating its near relation to *Z. elegans*, from which its dilated and oblanceolate foliage, broad sessile perianth-segments and merely retuse nectary require that it should be separated, n. 522.

VERATRUM CALIFORNICUM, Durand, Journ. Philad. Acad. 2 ser. iii. 103. Hesperus City, 16 July. Not numbered; therefore probably not in the sets.

LILIACEÆ.

LILIUM MONTANUM, A. Nelson, Bull. Torr. Club, xxvi. 6. In moist thickets of the La Plata Cañon, 12 July. Said to be rare; n. 1124, distr. as *L. Philadelphicum*, and none too distinct from that.

ERYTHRONIUM GRANDIFLORUM, Pursh, Fl. i. 231. In the La Plata Mts., on the Bear Creek Divide at 11,000 feet, 29 June, n. 213. Also at 10,500 feet near the Cumberland Mine, 15 July; not numbered; probably not in the sets.

LLOYDIA SEROTINA, Sweet, Hort. Britt. 2 ed. 527. At

timber line on Mt. Hesperus, 2 July; the specimens large, 6 or 7 inches high, the perianth more than ½ inch; n. 256.

Calochortus Gunnisonii, Wats. Bot. King Exp. 348. Sage plains about Mancos, 8 July, n. 1125.

Allium acuminatum, Hook. Fl. ii. 184, t. 196. Plains near Mancos, 21 June, n. 89.

Allium dictyotum. Bulbs ovoid, not deep-seated, clothed with thinnish fibrous-papery dry outer coats, these strongly reticulate: scapes stoutish, commonly 1 to 2 feet high, sometimes only 8 or 80 inches: leaves of two-thirds the length of the scape, ligulate, striate, obtusish: umbel comparatively small and dense, the stout pedicels short and uncommonly fleshy; perianths flesh-color; segments oval, acutish or obtuse: stamens much shorter; filaments broadly subulate to above the middle.

Cumberland Mine, La Plata Mts., at 10,500 feet, n. 479. Also on Mt. Hesperus at like elevation, n. 253; this distributed for *A. mutabile*, but only a smaller *A. dictyotum* evidently. The species is subalpine, and a fine large one, related, of course, to *A. reticulatum* and *mutabile*.

Vagnera stellata, Morong, Mem. Torr. Club, v. 114. At 9,500 feet, on Chicken Creek, n. 147.

Vagnera amplexicaulis, Greene, Man. 316. On the La Plata, altitude not given, n. 547.

Iridaceæ.

Iris Missouriensis, Nutt. Journ. Philad. Acad. vii. 58. At 8,000–9,000 feet, on Chicken Creek, n. 140.

Sisyrinchium montanum, Greene, Pitt. iv. 33. Meadows along the Mancos River, 25 June, n. 113; also at 9,000 feet, in Chicken Creek, 7 July, n. 377.

PLANTÆ BAKERIANÆ

By EDW. L. GREENE,

AND OTHERS.

VOLUME II.

FASCICLE I.

FUNGI TO GRAMINEÆ.

Price, Forty Cents.

INTRODUCTORY.

Mr. Baker's ample and most interesting collection of the year 1899 was made, as his own brief and pointed Itinerary will indicate, along the borders of southwestern Colorado and adjacent New Mexico. The field was one wisely selected, as the large proportion of new plants obtained sufficiently declares; while the great extent of the collection shows how vast an amount of travelling and of other physical labor the zeal and industry of one strong and vigorous young man can accomplish in a single season, and as it were single handed.

Our report upon this rich and beautiful collection will constitute Volume II of the PLANTÆ BAKERIANÆ. The material has, at this date, for the most part been quite carefully studied, and it is hoped that at intervals not widely separated the succeeding instalments of the volume may reach the hands of the subscribers to the sets.

Inasmuch as this second volume will inevitably catalogue many species that were reported in the first volume, the names of such as are, as it were, duplicated in the collection of 1899, will be printed in italics here, only such being excepted as were published as new in the first volume. The names of these will be given in the usual small capital type.

EDW. L. GREENE.

Catholic University of America,
Washington, D. C., 11 March, 1901.

Itinerary.

By Carl F. Baker.

The first camp of 1899 was established early in March at Hermosa, Colorado, at about 6,700 feet altitude, in the upper Animas Valley and on the west slope of the Needle Mountains. At this time, alder and the first willows were in bloom, and a few days later the first *Cymopterus* appeared. A few unopened flower buds of *Townsendia sericea* were also seen. During this month special attention was given to mosses, lichens and fungi, with good results. By April 1 *Pulsatilla* began to bloom.

On April 10 the second camp was made on the banks of the San Juan River, just below the town of Aztec, New Mexico, at an altitude of about 5,500 feet. This region is characterized by sand hills and gravelly mesas, sparingly covered with piñon pine and cedars, the whole very, very dry. The hills along the extreme southern border of Colorado do not differ essentially in many places from the Aztec hills, and the distance is not great. Undoubtedly most of the plants found at Aztec will also be found in Colorado. Many things were coming into bloom when camp was made at Aztec. During the month it was found that a very remarkable and evanescent flora existed among these hills. This flora appears during the very earliest warm days of spring. The plants arise from perennial bases, flower and fruit very rapidly, and have passed before hardly any of the plants usually considered so characteristic of the region are in their prime. Of most things, specimens were few and scattering. Miles and miles of the interminable piñon hills were tramped over to secure enough for issuance. On many of the days, the cold northwest winds were extremely bitter.

The statement that all plants in the '99 sets from this locality were taken during April or the first few days in May has seemed surprising, even to those best acquainted with collecting in the southwest. Summer and fall collecting in this locality would unquestionably give very interesting results.

During the early days of May camp was moved far up the valley of the Rio de los Pinos to the lower end of Graham's Park at an altitude of 7,800 feet. Here the results of a cold, dry spring were very evident, and collecting was poor.

On the 15th of the month camp was moved down the valley to Los Pinos P. O. (also known as Bayfield) on the same river, at about 7,000 feet altitude. This place is just north of the Ute Reservation line, and on the zonal division between *Pinus edulis* (piñon) and *Pinus ponderosa*. Here were still further signs of drought. Collecting was necessarily largely confined to the river bottoms and ground moistened by seepage from irrigating ditches.

On June 1 camp was moved to Arboles, in the river bottom at the junction of the Rio San Juan and Rio Piedra, only a few miles above the New Mexican border. Collections were made here and also at Rosa, New Mexico. Numerous large flocks of sheep were rapidly devastating the narrow bottoms. The destruction could scarcely have been more complete had the work been done by fire. A number of very interesting plants were found among the very dry sandy hills and along the stony mesa banks,—among them a new *Coleosanthus*, two new Astragali, and a new *Carduus*. As at Aztec, these hills are covered sparsely with piñon, pine and cedar, though otherwise the two localities are very distinct.

The next move made was up the Rio Piedra to Piedra

P. O., at about 7,000 feet altitude and well within the *Pinus ponderosa* zone. As will be seen from the Colorado Forestry Commission map, this zone curves strongly to the southeast, east of Durango, following the trend of the San Juan range. The road up the Piedra valley is new and extremely rough. An entire lack of bridges necessitated fording the river many times. Frequently the wagon wheels became wedged among the boulders of the river bed, compelling the carrying out of the entire load through the ice cold waters, by hand. *Habenaria hyperborea* was unexpectedly found about a cool spring in a dark shady gulch near Piedra and a new *Cypripedium* at the same place.

During the last of July a move was made to Pagosa Springs (at about 7,100 feet) over a good road passing through magnificent forests of *Pinus ponderosa.* The end of these forests is in sight, their destruction being actively under way now. The desolation caused by the lumberman and the fires which follow in his wake, is an evidence of an appalling lack of foresight, not possible in the more scientifically enlightened countries. In a favorable year Pagosa Springs would unquestionably be the most promising headquarters in southwestern Colorado for mountain botanizing. It is the center of a wonderful region, many distinct topographical areas being readily accessible. The unusually fine hot springs at this place attract many tourists through the season. Above this point are some of the finest natural meadows in the State. Under ordinary circumstances, at this season of the year there is still much snow on the surrounding mountains. But in 1899 none could be seen and the terrible drought was at its height. Sheep and cattle were hurried up from the lower levels, though many died of hunger and thirst. The most striking plant at this point was *Rhamnus Smithii.*

About August 1 another move was made over a road just built for mining purposes to Camp Loraine, in a narrow basin between Pagosa Peak and Saddle Mountain, at an altitude of about 9,000 feet. This whole basin is richly watered by small streams, but sheep and drought together had, during 1899, devastated the above-timber country. From this basin as a base, expeditions by foot were made for many miles about, over the surrounding mountains, an elevation of 12,500 feet being reached at several points. The results from above timber were very disappointing, though as full advantage as possible was taken of the richer vegetation below. Below timber line these mountains are richly clothed with magnificent forests of spruce—principally *Picea Engelmannii*. Deer and bear were abundant here and mountain lion frequent. Black grouse could also be had at any time. At this time should be acknowledged many kindnesses received from a very affable and whole-hearted gentleman, Mr. W. R. Black, of Pagosa Springs, part owner of the promising Baritone Wonder and Omaha mines near Camp Loraine. He gave freely all the needed information as to trails, topography, meteorology, and all similar matters. Camp at this point was regretfully broken up on August 30.

A ten days' stop at Chama, New Mexico, completed the season's work. During this ten days a trip was made up on Cumbres Pass, where an elevation of 10,000 feet was reached. But the sheep had been there first.

The collecting was done throughout by one person. It would have been entirely possible to have accomplished far more had the season and other conditions been more favorable. Whatever success was attained was due in no small measure to the faithful services of the camp-hand, an Alabama negro from Prof. Earle's station force. This man's

very unusual value lay not so much in his great strength and endurance, as in the fact that he would do exactly as told.

Throughout the field work constant reference was made to the very useful and minutely exact topographical maps lately issued by the Geological Survey, as well as to those of the Hayden Survey. Mention should also be made of the very interesting and valuable though not wholly correct map in the Biennial Report of the Forest Commissioner of the State of Colorado for the years 1887 and 1888.

CATALOGUE.

Fungi.

By F. S. Earle.

By the subjoined enumeration it will be seen that Mr. Baker's collection of 1899 is rich in new species of Ascomycetes, in this regard surpassing the collection made by Baker, Earle and Tracy in the same general region in the year 1898. The present list of species would have been more extensive had not much of the material collected on dead stems of herbaceous plants in early spring proven immature and thereby indeterminable. Those of the same habitat gathered in August, and even in July, were for the most part in good condition. This is especially true of species belonging to the Mycospærellaceæ, and the Pleosporaceæ. Specimens belonging to those families in which the perithecia on hard-carbonaceous, such as the Amphisphæraciæ and Lophiostomataceæ, usually contained recognizable asci and spores which had been found the year before, but were not in satisfactory condition.

Thanks are due to Dr. J. C. Arthur for aid in connection with the Uredinales; to Dr. L. M. Underwood for determining the species of *Polyporus*, and to Mr. David Griffiths for careful cultural studies of the Sordariaceæ.

Ustilaginaceæ.

Ustilago caricis, Fckl. Symb. 39. On *Carex elynoides*, Holm, near Pagosa Peak, Colo., at 12,000 feet, 26 Aug.; n. 89.

MELAMPSORACEÆ.

CRONARTIUM ASCLEPIADEUM THESII, Beck, Lea Catal. 71. On *Comandra*, at 8,000 feet, near Pagosa Peak, 30 Aug.; n. 22.

MELAMPSORA FARINOSA, Schrœt. Pilz. Schles. 360. On leaves of willow at Pagosa Springs, 21 July; n. 35.

PUCCINIACEÆ.

Æcidium abundans, Peck. At 9,000 feet, near Pagosa Peak, 27 Aug., on leaves of *Symphoricarpus*; n. 1.

ÆCIDIUM ALLENII, Clinton, Rep. N. Y. Mus. xxiv. 93. On leaves and twigs of *Lepargyrea argentea*, at Piedra, Colo., 14 July; n. 2.

ÆCIDIUM ASTERUM, Schw. Syn. Car. 67. At Chama, N. Mex., 8 Sept., on *Solidago*; n. 3.

Æcidium Clematitis, DC. Pagosa Springs, Colo., 18 July, on *Clematis hirsutissima*; n. 4. Again at Piedra, 15 July, on *C. ligusticifolia*.

ÆCIDIUM FENDLERI, Tracy & Earle, Pl. Baker, i. 17. At Pagosa Springs, 21 July, on *Berberis Fendleri*; n. 5.

ÆCIDIUM HEMISPHÆRICUM, Peck, Bot. Gaz. iii. 34. On *Lactuca pulchella* at Gato, N. Mex., 8 June; n. 6.

Æcidium Hydrophylli, Peck. Near Pagosa Peak, Colo., at 9,000 feet, 3 Aug., on *Hydrophyllum*; n. 7.

ÆCIDIUM PHLOGIS, Ell. & Ev. Bull. Torr. Club, xxiv. 284. At Aztec, N. Mex., 2 May, and at Los Pinos, Colo., 18 May, on *Phlox*; n. 8.

Æcidium Prenanthis, Pers. At about 9,000 feet, near Pagosa Peak, on *Helenium Hoopesii*; n. 9.

Æcidium Sommerfeltii, Johans. Near Pagosa Peak, 15 Aug., on *Thalictrum*; n. 11.

Gymnosporangium, sp. At Pagosa Springs, 28 July (immature), on juniper; n. 81. These are conspicuous galls, somewhat like those of *G. globosum*, but probably not of that species. They are also quite different from either of those uncertain forms taken in 1898, of which some account is given in Pl. Baker. i. 19.

Phragmidium occidentale, Arthur, n. sp. I. Æcidia hypophyllous, round, often 1 mm. across, at first waxy, on pale-yellow spots: æcidiospores concatenate, orange-color, fading to palè-yellow, round-elliptical, prominently warty, 19–24μ broad, by 24–30μ long; paraphyses forming a border, incurved, colorless, nearly terete.

II. and III. Hypophyllous in tufted groups. Uredospores obovate, echinulate upon small papillæ, 18–22μ broad by 26–28μ long, pores about 8, scattered; teleutospores cylindric, nearly black, 5–7-septate, surface tuberculate, 85–110μ long; apex rounded, usually bearing a conical nearly colorless apiculation; pedicel nearly colorless, enlarged below, as long as, or by one-half longer than the spore.

Mountains near Pagosa Peak at 9,000 feet, on *Rulus Nutkanus*, 3 Aug.; n. 48. The same as the *P. Rubi-Idæi* of Pl. Baker. i. 20, that is, Baker, Earle & Tracy's n. 1043; and both these collections are chiefly æcidiums. The æcidium of this species with its warty spores is perfectly characteristic. It is Peck's *Lecythea speciosa* (afterwards transferred to *Uredo* by De Toni in Saccardo's *Sylloge*, vii. 860), which was collected by T. S. Brandegee more than twenty years since (Conf. Bot. Gaz. iii. 24), on *Rubus deliciosus*. The species was issued in Ellis & Everhart's distribution, n. 3425, on *Rubus Nutkanus*, from Sisson, Calif.

(W. C. Blasdale), and as n. 3246 on *R. deliciosus* from Rustic, Colo. (C. F. Baker). The original specific name is pre-occupied in the present genus (J. C. Arthur).

Phragmidium speciosum, Fr. Syst. iii. 496. The Uredo only, on leaves and petioles of a wild rose, at Pagosa Springs, 21 July; n. 49.

Puccinia Agropyri, Ell. & Ev., Journ. Myc. vii. 131. At Hermosa, Colo., 1 April, on dead foliage of *Agropyrum tenerum*; n. 56.

Puccinia Epilobii, DC I & II, on on *Epilobium*, at Pagosa Springs, 18 July; n. 57. III on dead stems of *Epilobium*, at Hermosa, Colo., 30 March.

Puccinia Gayophyti, Billings. At Pagosa Springs, 22 July, on *Gayophytum*; n. 58.

Puccinia mirabilissima, Peck, Bot. Gaz. vi. 226. Hermosa, Colo., on *Berberis nana*, in March; n. 60.

Puccina Taraxaci, Plowr. Brit. Ured. 186. At Piedra, Colo., 14 July, on *Taraxacum officinale*; n. 59. Baker Earle & Tracy's n. 57 is of this species, though in Pl. Baker. i. 21, it is referred to *P. Hieracii*, and was so distributed.

Puccinia Rhamni, Wettst. Verh. Zool-Bot. Wien. (1885), 545. Æcidia on leaves and twigs of *Rhamnus Smithii* at Pagosa Springs, 28 July; n. 10.

Puccinia Stipæ, Arth. Bull. Iowa Coll. (1884) 160. Hermosa, 3 April, on dead leaves of *Oryzopsis*; n. 61. Some specimens of this went out to subscribers named as a new species.

Puccinia substerilis, Ell. & Ev. Bull. Torr. Club, xxii. 58. Chama, N. Mex. 8 Sept. on *Stipa*; n. 122.

Uromyces Eriogoni, Ell. & Hark. Pagosa Springs, 26 July; n. 85.

Uromyces Euphorbiæ, C. & P. I & II, on *Euphorbia*, at Pagosa Springs, 28 July (no number given. E. L. G.).

Uromyces Glycyrrhizæ, Mag. II, on *Glycyrrhiza lepidota*, at Pagosa Springs, 28 July; n. 86.

Uromyces Lupini, B. & C. N. Pacif. Exp. n. 133. At Hermosa, Colo., 28 March, on dead leaves and stems of some lupine; n. 87.

Uromyces Zygadeni, Peck, Bot. Gaz. vi. 239. Los Pinos, Colo., 18 May, on *Zygadenus*; n. 88.

Polyporaceæ.

By L. M. Underwood.

Polyporus applanatus, Wallr. Kr. Fl. ii. 591. On birch at Los Pinos, 30 May; n. 54.

Polyporus Ellisianus, Anders. Bot. Gaz. xvi. 113. On trunks of *Lepargyrea argentea*, at Aztec, N. Mex., 11 April; n. 55. Not often collected. Anderson's types, which are at Columbia University, are older, and stratose with many layers.

Lycoperdaceæ.

Astræus stellatus, Fisch. in Engl. & Prantl, Lief. 193, p. 341=*Astræus hygrometricus*, Morgan. On the ground in the edge of scrub-oak thickets at Hermosa, Colo., 29 March; n. 13.

Helotiaceæ.

Dasyscypha allantospora, n. sp. Ascocarps sessile, scattered or somewhat gregarious, cup shaped when moist, becoming sphaeroidal by the closing of the margin when dry, abundantly clothed above with long, straight, agglu-

tinated, continuous hairs 3–4μ in diameter, roughened and nearly black below, disc pale ochraceous, about 1mm.: asci clavate-cylindric, stipitate, thin walled, about 70–80x8μ; paraphyses slender, thread like, minutely guttulate: ascospores distichous or inordinate, hyaline, cylindric, curved, ends obtuse, 18–20–4μ.

On old decorticated twigs of *Cratægus rivularis*, Los Pinos, Colo., 30 May; n. 25. Also on decorticated twigs of *Rhus trilobata*, Hermosa, Colo., Apr. 9, and on *Fendlera rupicola*, Hermosa, Apr. 4.

The disc is completely hidden when dry by the drawing down of the margin with its vestiture of bright orange-red hairs. It is a handsome and well marked species.

Dasyscypha Bakeri, n. sp. Ascocarps thickly scattered, superficial, sessile, short cylindric or cup shaped when moist, contracted to subsphaeroidal when dry, small $\frac{1}{4}$–$\frac{1}{3}$mm., clothed externally with crisped, roughened, usually continuous and simple, fuscous hairs 100–200x3μ, substance of peridium delicate, of closely packed parallel thin walled thread like cells about 2μ in diameter, disc pure white, margin of short white teeth erect or spreading when wet, incurved when dry: asci cylindric, substipitate, 60–80x6μ; paraphyses thread like: ascospores distichous, narrowly oval, ends subacute, hyaline, continuous, about 12x3μ.

On dead stems of *Corydalis Brandegei*, near Pagosa Peak, Colo., 10,000 feet, 29 Aug.; n. 128.

Hymenoscypha (Phialea) cyathoidea, Phill. Brit. Disco. 140. Same habitat and same host as the last, also on *Veratrum*, at same locality and date; n. 128 in part.

Lachnella rhoina, n. sp. Ascocarps 1–2mm. when moist, $\frac{1}{2}$–1mm. when dry, at first partially buried in the wood fibres of the matrix, soon nearly superficial, black, composed of

loosely connected, thick walled, dark brown cells that are about 12x8μ, thickly clothed throughout with continuous, light cinnamon or orange brown, heavily roughened, somewhat crisped hairs, about 150–200x4μ, margin partially open when moist disclosing the salmon or orange disc, closely inrolled and covering the disc when dry; asci cylindric, short stipitate: paraphyses thread like, ends not thickened, about equalling the asci; ascospores subdistichous, cylindric-fusoid, at length faintly uniseptate, hyaline or slightly tinted, 8–10x3μ.

On decorticated branches of *Rhus trilobata*, Hermosa, Colo., 1 Apr.; n. 31. This is near *L. rhizophylla* E. & E. Proc. Philad. Acad. (1894); 348, but disagrees with the description there given in its somewhat larger size and slightly smaller spores, but more particularly in the cinnamon-brown of the crisped, continuous hairs and in the orange disc. In the latter species the color is "dirty white," the hairs are septate, and the disc has "no shade of yellow."

Mollisiaceæ.

Niptera(?) coccinea, n. sp. Scattered or gregarius; ascocarps irregular saucer shaped, $\frac{1}{3}$–$\frac{1}{2}$mm., soft, thin, subgelatinous, bright vermilion throughout or sometimes the margin bordered by a lighter nearly white line: asci oval, crowded, 40–50x4–6μ; paraphyses thread like, indistinct, scarcely exceeding the asci and not forming and not forming an epithecium; ascospores subcylindric, hyaline, once septate, not constricted, about 8x3μ.

On dead stems of *Corydalis Brandegei*, near Pagosa Peak, Colo., 10,000 feet, 29 Aug.; n. 178 in part. The ascocarp is exceedingly thin and delicate and the hypotheceum is scantily developed.

PATELLARIACEÆ.

CALDESIA SABINAE (De Not.) Rehm. Eng. & Prantl, i. 1. 223.=*Karschia sabinæ* Rehm. Sacc. Syl. viii. 781. On shredded bark of *Juniperus*, Hermosa, Colo., 28 March; n. 16. This has not been before reported from America. The asci are 100x40μ and the spores 40x18μ. The asci are 8-spored as figured in Eng. & Prantl. l. c., not 4-spored as given by Saccardo.

KARSCHIA OCCIDENTALIS, n. sp. Ascocarps black, sessile, discoid, the base sunken in the matrix, margin short, inconspicuous, disc black, rugose, plane or somewhat convex, about $\frac{1}{2}$mm.; asci crowded, cylindric, about 40–50x8–10μ; paraphyses exceeding the asci, the tips indistinguishably, blended in a dense epithecium; ascospores subdistichous, oval, brown, slightly curved, uniseptate, not constricted, about 12x6μ.

On barkless weather-worn branches of *Juniperus*, Hermosa, Colo., Apr. 3, (no number given. E. L. G.). Some minute flecks of lichen thallus were observed on the same twigs but they seemed to have no connection with the fungus.

MELASPILEA EMERGENS, RHEM.? Disc. 363. *Glonium emergens*, Duby. Hyst. i. 36.

On decorticated, weather-worn twigs of *Cercocarpus*, Hermosa, Colo., March 29. On *Amelanchier*, Hermosa, March 30. On *Quercus*, Durango, March 23, and Hermosa, Mch. 28. On *Fendlera rupicola*, Hermosa, Apr. 4, (no numbers given. E. L. G.).

This species has not been heretofore reported from this country, and we have seen no authentic specimens; but the material answers well to published descriptions.

Patinella Crandallii Sacc. On *Sieversia turbinata*, near Pagosa Peak, 11,500 feet, 6 Aug.; n. 44.

Tryblidiaceæ.

Heterosphaeria Fendleraecola, n. sp. Ascocarps thickly scattered, at first buried, becoming erumpent or subfree, closely sessile, dark brown, almost black, coriaceous, cup shaped, about ½–1mm., the epithecium at first covered by a membrane that soon splits stellately into about 20 marginal teeth that are erect, exposing the epithecium when moist but closed down over it when dry; epithecium dark brown; asci 50–60x5μ, cylindric-clavate, embedded in the numerous paraphyses that unite above in a well marked epithecium; ascospores distichous or inordinate, spindle shaped, hyaline, somewhat unequally uniseptate, 8–10x2–3μ.

On dead weather-worn twigs of *Fendlera rupicola*, Hermosa, Colo., April 4, (no number given. E. L. G.).

Tryblidiopsis occidentalis, n. sp. Ascocarps scattered, at first buried, then prominently emergent and almost free, sessile, black, dull, somewhat rugose, long closed, at length irregularly or stellately dehiscent exposing the dark brown disc, from ½–1mm. in diameter; asci broadly oval, thick walled, about 100x25–30μ; paraphyses greenish, much exceeding the asci, branched and interwoven above into a dense epithecium; tips scarcely swollen; ascospores broadly oval, ends rounded, uniseptate, at first hyaline and surrounded by a gelatinous envelope that is thickest at the septum, finally loosing this coating and becoming dark brown and somewhat constricted, about 30x18μ.

On the smooth bark of dead twigs of *Juniperus*, Hermosa, Colo., April 3. This is the first species of this well marked genus to be detected in this country.

Tryblidium occidentale, n. sp. Gregarious, often crowded; ascocarps Patellaria-like, at first somewhat sunken in the matrix, then free, black, subrugose, about ½mm.

wide, flat, sessile, long closed but finally exposing the orbicular, rugose, dull black disc, margin inconspicuous; asci 80–100x20μ, thick walled; paraphyses numerous, thread like, united above in a thick epithecium; ascospores distichous, ovoid, ends obtuse, about 5 septate, somewhat constricted, part or all of the cells longitudinally divided, hyaline or probably at length brownish, about 30x10μ.

Common on decorticated twigs of *Amelanchier*, *Cercocarpus*, *Quercus* (n. 14), *Rhus*, and *Salix* (n. 15), Hermosa, Colo. March and April, 1899. Often associated with *Lophium leptothecum* and *Melaspilea emergens*. Issued as *Blitridium rhois* n. sp.

HYSTERIACEÆ.

HYSTEROGRAPHIUM BAKERI, n. sp. Blackening the substratune; ascocarps gregarious, often crowded, dull black, superficial, subcylindric, ends obtuse, lips at first firmly closed forming a slightly elevated ridge, at length sometimes slightly parted but not exposing the disc, usually laterally longitudinally striate, $\frac{1}{2}$–1mm. x about $\frac{1}{3}$mm.; asci subcylindric, exceeded by the thread like paraphyses, about 80x12μ; ascospores distichous, variously elliptic or subcylindric, usually 5–7 septate, slightly constricted, one or more of the medial cells once vertically or obliquely divided, ends narrowed but obtuse, light brown, 20–22x6μ.

On decorticated wood of *Cercocarpus*, Hermosa, Colo., March 28.

HYSTEROGRAPHIUM INCISUM, E. & E. Bull. Torr. Club, xxiv. 462. On dead twigs of *Peraphyllum*, Durango, March 19. On *Amelanchier*, Hermosa, March; n. 30.

HYSTEROGRAPHIUM, sp. On *Quercus*, Durango, March 27. A small specimen insufficient for full determination; probably new.

LOPHIUM LEPTOTHECUM, n. sp. Scattered or gregarious: ascocarps erect, elongate, compressed, the base sunken in the wood fibers, black, brittle, carbonaceous, roughened by transverse striations, black and shining within, lips thin, closely compressed, 1–1½mm. high, about ½mm. broad with the sides nearly parallel or slightly tapering upward, about ¼mm thick; asci numerous, very long, 400–500x6μ; paraphyses abundant, threadlike, very slender, less than 1μ thick, not conspicuously branched; ascospores dark-brown equalling the ascus, about 2μ thick, conspicuously and closely septate, the cells 2–3μ long, when freed from the ascus usually breaking into pieces, 12–16 feet long.

On barkless dead twigs of *Amelanchier* (n. 83), and *Quercus* and *Rhus* (n. 84) at Hermosa, Colo., March. Ellis records doubtfully three species of this genus as occurring in North America. The first seems to have been a case of mistaken identification; and of the two Schweinitzian species he is unable to give any account of the asci and spores. This new one seems therefore to be the first fully authentic member of this genus to be found in America.

ERYSIPHACEÆ.

ERYSIPHE POLYGONI, DC. Fl. Fr. ii. 273. At 9,000 feet, near Pagosa Peak, 18 Aug., on *Lathyrus* (n. 29), and on dead stems of a lupine, at Hermosa, 28 March (n. 80); also at Pagosa Springs, 28 July, on *Thermopsis*; n. 79.

MICROSPHÆRIA DIFFUSA, C. & P. Journ. Bot. ii. 1. 13. *M. Symphoricarpi*, Howe, acc. to Salmon in Mem. Torr. Club, ix. 161. Near Pagosa Peak at 9,000 feet, 30 Aug., on leaves of *Symphoricarpus*; n. 36.

HYPOCREACEÆ.

ALLANTONECTRIA, gen. nov. Perithecia as in *Nectria*; ascospores allantoid, 1-celled, cylindric, curved, hyaline.

Allantonectria Yuccæ, n. sp. Densely cespitose, 12–20 or more perithecia united on a stroma; stromatic clusters erumpent, thickly scattered or subconfluent, average size about 1mm.; perithecia bright-red, becoming dark dull-red when dry, globose, smooth or slightly roughened, collapsing, 100–125μ; asci 8-spored, clavate, minute, aparaphysate (?), about 20–30 x 3–4μ; ascospores distichous or inordinate, minute, 4–5 x $\frac{3}{4}$–1μ.

On dead, withered leaves of *Yucca*, at Hermosa, 28 March; n. 12.

Dothideaceæ.

Dothidea conspicua, Griff. Bull. Torr. Club, xxvi. 442. At Hermosa, 30 March, on dead leaves of *Yucca*; n. 28.

Sordariaceæ.

By David Griffiths.

Delitschia furfuracea, Niessl. in Sacc. Syll. ix. 747. Hermosa, 28 March, on excrement of donkeys; n. 26.

Hypocopra equina, Sacc. Syll. i. 247. With the last, and same date, on horse-dung.

Hypocopra merdaria, Fr. Elench. ii. 100. With the two foregoing (no numbers assigned for these. E. L. G.).

Sordaria fimicola, Ces. & De Not. Schem. 52. With *Delitschia furfuracea*.

Sphæriaceæ.

Rosellinia parasitica, Ell. & Ev. Proc. Philad. Acad. (1890) 227. On dry barkless twigs of *Symphoricarpus* at Durango, 18 March; n. 64.

Rosellinia pulveracea, Fckl. Symb. 149. At Durango on dead stems of *Chrysothamnus*, 23 March. Specimens in the main at agreement with other western ones that have

been referred here; but the asci are only 60–80x6μ, and the ascospores 8–10x4–5μ which is smaller than the measurements usually given. In Durango specimens on oak, and others from Hermosa, the perithecia are superficial, or nearly so, but seem partially buried by the fine fibrous shreds of the weather-worn wood.

Rosellinia subcompressa, Ell. & Ev.? Bull. Torr. Club, xxiv. 177. On barkless wood of poplar, at Hermosa, 1 April; n. 65. In the absence of authentic specimens for comparison these are so named with some doubt, though they agree with the short description given.

Cucurbitariaceæ.

Cucurbitaria Berberidis, S. F. Gray, Nat. Arr. i. 519. Durango, 19 March, on dead twigs of *Berberis Fendleri.*

Otthia Clematitis, n. sp. Perithecia crowded or occasionally scattered, dull-black, carbonaceous, rugulose, about $\frac{1}{2}$ mm. in diameter, ostiole perforate, slightly sunken, seated on a thin crust-like black stroma that remains after the breaking down of the perithecia, developing under the cuticle but exposed by its rupturing and breaking away, by confluence sometimes forming linear masses several cm. in length; asci paraphysate, subcylindric, 90–120x16–20μ; ascospores inordinate, oval, ends subacute, slightly constricted, often somewhat curved, about equally uniseptate, light brown, about 40x8μ.

On dead and decaying bark of *Clematis ligusticifolia,* Durango, 19 March; n. 41. Most of this material is too old The species should be collected in autumn. On some stems the perithecia are mostly scattered so that it might be taken for a *Didymosphæria.* In other cases they are densely cespitose and seated on an evident stroma.

Otthia Fendleraecola, n. sp. Perithecia buried, then partially erumpent, densely crowded in one or two rows and bursting through the bark in long linear masses, 6 or 8 to 20 or more together, often flattened by mutual pressure, dark brownish black, conspicuously rugose, large, $\frac{1}{3}$–$\frac{2}{3}$ mm., ostioles, perforate, depressed; asci cylindric, about 100x18μ; paraphyses thread like; ascospores monostichous or partly distichous, light brown, fusiform, ends acutish, uniseptate, not constricted, about 25x6μ.

On dead and dry but not barkless twigs of *Fendlera*, at Hermosa, 4 April; n. 42.

Otthia Distegiæ, Tracy & Earle, Pl. Baker. i. 29. Durango, 20 March; n. 43, on the same host as the original specimens, namely, Baker, Earle & Tracy's n. 1090.

Amphisphæriaceæ.

Strickeria Amelanchieris, n. sp. Perithecia scattered or somewhat gregarious, black, smooth, thin walled, strongly collapsing, about $\frac{1}{3}$ mm, ostioles indistinctly perforate, not prominent; asci clavate-cylindric, about 100x16μ; paraphyses thread like, abundant; ascospores subdistichous, irregularly oval, often curved, 5–7-septate, one or more of the medial cells once vertically divided, constricted at the middle septum and often slightly so at the others, somewhat flattened, about 30–35x10x7μ.

On decorticated twigs of *Amelanchier*, Hermosa, Colo., 30 March; n. 69.

This is much like *S. Fendleræ* externally, but it has very different spores.

Strickeria Cercocarpi, n. sp. Blackening the wood; perithecia with the base sunk in the matrix, scattered or cespitose in clusters of 3 or 4, black, rugose, not shining, a

length slightly collapsing above, about ½mm., ostiole minutely papillate, rather inconspicuous; asci cylindric, short stiped, about 100x10μ; paraphyses very numerous, thread like, exceeding the asci; ascospores monostichous, oval to ovate, dark brown, at length 7-septate, with most of the cells once or twice vertically divided, constricted at the middle septum, ends often somewhat unequal, obtuse or subacute, 20–25x8μ.

On old decorticated branches of *Cercocarpus*, at Hermosa 28 March.

Strickeria Fendleræ, n. sp. Perithecia scattered or gregarious, black, shining, thin walled, collapsing to patelloid, 200–300μ; asci cylindric, thick walled, 80–100x20μ; paraphyses thread like, abundant; ascospores distichous, oblong, ends obtusely rounded, 4 septate, one or more medial cells vertically divided, hyaline, at length very light brown, 25–30x10μ.

On barkless weather-worn twigs of *Fendlera rupicola*, Hermosa, 4 April.

This species is well marked by the strongly collapsed perithecia that look like a minute saucer-shaped *Patellaria* and by the nearly hyaline spores.

Strickeria Populi, n. sp. Perithecia scattered, black, shining, the largest ½mm. in diameter, subglobose, at length slightly collapsed or indented above, ostioles simply perforate; asci about 80x16μ; ascospores monostichous, at first yellowish and uniseptate, becoming brown and 3-septate, constricted at each septum, one or both medial cells vertically divided, ends obtuse, about 18–20x8–10.

On decorticated, weathered twigs of *Populus angustifolia*, Durango, 21 March; n. 68.

This is near *S. insecura*, but differs in the shining, par-

tially collapsing perithecia and in the smaller asci and spores. The spores do not seem in any case to be more than 3-septate while in the latter species they are often 5- and even 7-septate as seen in N. A. F. n. 882 and in Baker, Earle & Tracy, n. 1059.

STRICKERIA RHOINA, n. sp. Perithecia thickly scattered, bases deeply buried, dull black, $\frac{1}{2}$–$\frac{3}{4}$ mm., at length collapsing, ostioles minutely papillate, often obscure; asci cylindric, short-stipitate, about 100–120x10μ; paraphyses numerous, thread-like, exceeding the asci; ascospores strictly monostichous, ovate, yellow or light-brown, at first 3–4-septate, becoming 5–7-septate, one or more medial cells once vertically divided, slightly constricted at the middle septum, about 20x8μ.

On decorticated wood of *Rhus trilobata*, Hermosa, March 29. The asci and spores are much as in *Teichospora rhypodes* on *Rhus* from Michigan, but the perithecia are twice the diameter, strongly collapsing, and lack the "conic-papilliform" ostiolum of that species.

STRICKERIA, sp. On decorticated *Salix*, Hermosa, March 28. The specimens are too old for satisfactory identification. The spores are 7-septate, 35x15μ.

STRICKERIA, sp. On *Quercus*. Same place and date; not in condition to be determined.

TREMATOSPHÆRIA CHRYSOTHAMNI, n. sp. Perithecia scattered or somewhat closely gregarious in small groups, black, shining, carbonaceous, nearly spherical but the top slightly flattened, not collapsing, about $\frac{1}{4}$mm., ostiole minutely papillate; asci clavate, 70–80x8–10μ; paraphyses numerous, filiform, yellowish; ascospores distichous, light-brown, somewhat fusiform, often curved, 2–4-septate, somewhat constricted at the septa, 16–20x4–5μ.

On decorticated stems of some *Chrysothamnus*, Hermosa, 4 April; n. 70.

Trematosphæria Fendleræ, n. sp. Scattered or gregarious on more or less blackened areas; perithecia prominent, conic-mammellate, dark brownish black, roughened toward the base, carbonaceous, not collapsing, ½mm. or more in both height and diameter; asci subcylindric, thin-walled, about 60–80x18μ; paraphyses abundant, filiform; ascospores normally distichous but often obliquely monostichous or inordinate, narrowly oval, somewhat curved, dark-brown, 3-septate, scarcely constricted, about 20–25x6μ.

On decorticated twigs of *Fendlera*; same place and date as the last.

Trematosphæria Lupini, n. sp. Perithecia scattered, black, carbonaceous, free, with base slightly sunken, spherical or somewhat vertically elongated, about ¼–⅓mm., ostiole scarcely papillate, perforate, the top of the perithecium finally breaking in but not collapsing; asci numerous, clavate-cylindric, short-stipitate, about 80x8μ; paraphyses filiform, abundant; ascospores distichous or inordinate, slender, pointed, light brown, 5–7-septate, 30–40x4μ.

On old stems of *Lupinus*, Hermosa, 28 March; n. 71.

Lophiostomataceæ.

Lophiotrema Cercocarpi, n. sp. Perithecia closely gregarious on extended blackened areas, dull-black, conical, the base sunk in the matrix, ostioles conspicuously conic-papillate, compressed, opening by a slit; asci clavate, thin-walled, about 80–100x12–15μ; paraphyses abundant, filiform, exceeding the asci; ascospores distichous, fusoid-falcate, ends acute, not appendaged, 3–5-septate, slightly constricted, each cell with a conspicuous large central gutta, hyaline or faintly olivaceous, about 35x8μ.

On dead barkless wood of *Cercocarpus*, Hermosa, 28 March.

Platystomum hysterioides, n. sp. Perithecia scattered, elongate, about 1x½mm., rough, dull-black, the base often clothed by clinging wood fibres, ostioles inconspicuous, at length opening by a crack or chink; asci cylindric, short-stipitate, 100–140x12μ; paraphyses filiform, abundant; ascospores ovoid, 3-septate, constricted at middle septum, ends somewhat unequal, one or both medial cells once vertically divided, light-brown, becoming dark-brown and opaque at full maturity, about 20x10μ.

On decorticated *Amelanchier*, Hermosa, 30 March; n. 75; also on *Fendlera*, Hermosa, 4 April.

Platystomum salicum, n. sp. Perithecia scattered, at first buried then emergent, black, shining, elongate, ¾–1mm. long by about half as wide, ostioles perforate, usually slightly sunken, longer than wide; asci clavate, thick-walled, 80–100x16μ; paraphyses abundant, filiform; ascospores subdistichous, 5- or occasionally 7-septate, slightly constricted at middle septum, ends subacute, often curved, one or two cells vertically divided, the divided cells usually somewhat enlarged, light-brown, at length dark and opaque, 30–35x7–8μ.

On dead barkless willow twigs at Hermosa, 30 March.

Schizostoma Cercocarpi, n. sp. Developing under the bark which falls away, exposing extensive black crust-like areas; perithecia oval, about ⅓x¼mm., black, scarcely shining, densely crowded, often a little confluent, seated on a thin black stromatic crust, ostioles inconspicuous consisting of an obscure compressed ridge extending for three-fourths the length of the perithecium; asci linear-cylindric, abundantly paraphysate, about 80x6μ; ascospores mono-

stichous, fusiform, uniseptate, constricted, light olivaceous brown, about 16–18x4μ.

On dead, but not weather-worn branchlets of *Cercocarpus* at Hermosa, 28 March.

Mycosphærellaceæ.

Mycosphærella delphiniicola, n. sp. Perithecia aggregated on irregular blackened spots, nearly spherical, black, 100–150, ostioles inconspicuous, seated on irregularly anastainosing mycelial threads beneath the epidermis and coming away with it; asci aparaphysate, clavate, clustered, 40–60x6–8μ; ascospores distichous, narrowly oval, ends acutish, hyaline, uniseptate, not constricted, about 12x3μ.

On dead stems of *Delphinium*, near Pagosa Peak, 10,000 feet, 29 Aug.; n. 37.

Mycosphærella Pentstemonis, n. sp. Perithecia rather densely aggregated on irregular blackened areas, black, nearly spherical, of coarse cellular structure, about 150–200μ in diameter, seated on a brown, much branched, frequently septate mycelium of very large brown threads 10–12μ thick, the branches slenderer; asci aparaphysate, clustered, clavate, about 60x12μ; ascospores distichous or inordinate, ovate, hyaline, often guttate, unequally uniseptate, constricted, about 25x6μ.

On dead leaves and stems of *Pentstemon*, near Pagosa Peak, 10,000 feet, 29 Aug.; n. 38.

Mycosphærella phlogina, Earle. *Sphærella phlogina* E. & E. Journ. Myc. iv. 65. On dead leaves of *Gilia Nuttallii*, near Pagosa Peak, 11,000 feet, 12 Aug.; n. 39.

Mycosphærella, sp. On dead stems of *Sedum rhodanthum*, near Pagosa Peak, Aug. 29. Mostly sterile.

Mycosphærella sp. On dead stems of *Senecio* near Pagosa Peak, 10,000 feet, 29 Aug.; n. 40.

Pleosporaceæ.

Leptosphæria Doliolum (Pers.) De Not. Schem. Sfer. 61.

On dead stems of *Heracleum*, near Pagosa Peak, 10,000 feet, 29 Aug.; n. 32.

Leptosphæria lupinicola, n. sp. Perithecia thickly scattered or gregarious, buried but becoming exposed by the shredding of the epidermis, black, somewhat roughened, not collapsing, ostioles strongly papillate, 200–250μ; asci subcylindric, thin walled, about 80x8μ; paraphyses threadlike; ascospores subdistichous, cylindric, curved, light olivaceous, 3-septate, cells uniform, not constricted, 25–30x4μ.

On dead lupine stems, Hermosa, 4 April; n. 82. This seems to be sufficiently distinct from any of the many species attributed to papilionaceous hosts.

Leptosphæria Typhæ Karst. (?) Myc. Fenn. ii. 99.

On dead stems of *Typha*, at Hermosa, 30 March; n. 33.

This differs materially from all other specimens of *Leptosphæria* found on *Typha* in this country in the decidedly smaller spores and narrower asci. Our specimens have the asci about 60x12μ and the spores only 20x5μ, while in specimens of *L. typharum* (Desm.) Karst. the asci are 60–80x20μ, and the spores 25–30x7–8μ. Our measurements of perithecia asci and spores agree closely with those published for *L. Typhæ*, but in our specimens the perithecia are often densely cespitose in clusters of 6 or 8 to 20 forming double or single lines and not "scattered" as described for the European specimens.

Leptosphaeria Veratri, n. sp. Perithecia scattered, buried except the strongly papillate ostioles, $\frac{1}{4}$–$\frac{1}{3}$mm., of

large, loose-celled parenchyma, the cells 8–10μ in diameter and arranged somewhat radially; asci clavate, substipitate, about 100x10μ; paraphyses abundant, filiform; ascospores subdistichous, light-yellowish, 3-septate, much constricted, ends rounded, one of the medial cells usually slightly enlarged, 20–25x5μ.

On dead, weathered stems of *Veratrum*, near Pagosa Peak, 10,000 feet, Aug. 29. The perithecia are finally exposed by the falling away of the weathered epidermis giving some of the older specimens the aspect of a *Trematosphaeria*.

Pleospora aurea, Ell. Bull. Torr. Club, x. 53, and N. A. Pyrenomycetes 340, not of Tassi. Atti. R. Acc. Siena, 1896. On dead stems of *Ligusticum*, near Pagosa Peak, 10,000 feet, 23 Aug.; n. 50.

Pleospora compositarum, n. sp. Perithecia scattered, buried, flattened, black, about 200μ, membranous, of firm cellular parenchyma, cells small, 4–8μ, fringed at base with short mycelium strands; asci oval to ovate, short-stipitate 80–90x20μ; paraphyses abundant, exceeding the asci; continuous but conspicuously guttulate, tips slightly swollen and sometimes vaguely branched; ascospores distichous, brown, irregularly oval to ovate, ends obtuse, 5- (occasionally 6–7-) septate, conspicuously constricted at the middle septum and often somewhat curved, medial cells usually once vertically divided, end cells entire, 20–25x8–10μ.

On dead stems of *Eucephalus*, at Hermosa, 30 March; n. 76. This is smaller throughout than *P. herbarum* and the spores are usually only 5-septate. It agrees quite closely with the description of *P. vulgaris* Niesse., as given by Ellis, N. A. Pyr. 339, but the spores are quite different from those figured by Berlese in his Monograph Pl. 2 fig. 6 for *P. infectoria* Fckl. to which species he reduces *P. vulgaris*.

Pleospora herbarum (Pers.) Rabh. in Sacc. Syll. ii. 247. On dead stems of *Lupinus*, Hermosa, March 28, and of *Erigeron flagellaris*, Hermosa, 4 April, n. 51. This seems to be the typical form of a widely dispersed species.

Pleospora lepidiicola, n. sp. Perithecia abundant, scattered, buried, the papillate ostioles alone protruding, black, 200–300μ in diameter; asci very numerous, subcylindric, short-stipitate, 100–120x20μ; paraphyses numerous, filiform; ascospores subdistichous, ovate, ends broadly rounded, light-brown, 7-septate, much constricted at middle septum, ends somewhat unequal, each section three or more times vertically divided, the vertical septa sometimes continuous for half the length of the spore, sometimes interrupted, about 20–28x10–11μ.

On dead stems of *Lepidium apetalum*, Hermosa, 30 March; n. 52.

This approaches some of the smaller spored forms that have been referred to *P. herbarum*. By some it would doubtless be considered as belonging to that composite species to which has been referred material from all the continents and on hosts belonging to most of the larger families of flowering plants. Such mixing of things can serve no good purpose in classification.

A number of fuscous mycelial threads are usually to be seen adhering to the base of the perithecium, but there are no bristles about the ostiolum as in the closely related genus *Pyrenophora*.

Pleospora permunda (Cke.), Sacc. Syll. ii. 243. On dead stems of some composite, near Pagosa Peak, Aug. 29; n. 53. The spores are rather large for this species, measuring 30x12μ.

Pleospora Senecionis, n. sp. Perithecia scattered, buried,

becoming exposed by the shredding away of the weathered tissues of the host, black, small, 200μ or less, collapsing to saucer-shape, of soft loose-celled panachyma, the cells about 10μ in diameter, ostioles inconspicuous; asci oval, nearly sessile, about 80x18μ; paraphyses scanty, filiform, slender, continuous; ascospores subdistichous, ovate, ends rounded, brown, 5–7-septate, each cell usually once vertically divided, slightly constricted at middle septum, medial cells usually much shorter than the end cells, covered at least when young with a hyaline mucous coating 1–4μ thick, 20–30x12μ.

On dead stems of *Senecio*, Hermosa, 28 March. Much like forms that have been referred to *P. vulgaris*, Niessl. It also resembles what is described above as *P. compositarum*, but differs in the softer large-celled wall of the perithecium, and in the septation and mucous coating of the spores.

Pyrenophora Castilleiæ, n. sp. Perithecia scattered, black, buried, becoming exposed by the shredding of the epidermis, 150–200μ, collapsing, covered throughout with crisped, fuscous hairs, 40–100x4μ, these at length deciduous above but remaining as a vestiture below, ostiole perforate, scarcely papillate; asci, oval to ovate, about 80x30μ; paraphyses filiform, exceeding the asci; ascospores distichous or inordinate, oval, 5–7-septate, each cell 2–3 times vertically divided, when young yellow and constricted uniseptate, at maturity dark-brown and scarcely at all constricted, 25–30x10–12μ.

On dead stems of *Castilleia*, Hermosa, April 5. Resembles *P. Eriogoni*, following, but differs in the smaller collapsing perithecia and the shorter partially deciduous vestiture. The asci, too, are shorter and the spores are not constricted at maturity.

Pyrenophora clematitis, n. sp. Perithecia black, buried

or finally exposed, about 150–175μ, beset by a few rather stiff brown hairs or bristles about 30–50μ long, strongly collapsing, ostiole conspicuously papillate; asci oval or ovate, 80–90x20–25μ; paraphyses filiform; ascospores distichous, oval, 5–7-septate, some or all of the cells once or twice vertically divided, slightly but plainly constricted at all the septa, from yellow to brown, finally becoming very dark and opaque, and seeming somewhat shrunken, 20–30x 12–15μ.

On dead stems of *Clematis ligusticæfolia*, at Hermosa, 1 April.

Pyrenophora Eriogoni, n. sp. Perithecia buried, becoming exposed by the shredding of the bark, scattered, dark-brown, about ¼mm., clothed throughout with somewhat crisped, spreading, occasionally septate hairs that are 80–150x4μ in length, dark-fuscous at base but nearly hyaline at the tip, ostiole inconspicuous, slightly depressed but not collapsing; asci cylindric, thick walled, about 120x 25μ; paraphyses numerous, filiform; ascospores ovate, ends obtusely rounded, bright-brown, 7-septate, constricted at the middle septum, ends unequal, all the cells 2–4 times vertically divided, about 25–30x12μ.

Hermosa, 3 April, on dead stems of *Eriogonum*; n. 62. The asci and spores are much as in some forms of *Pleospora herbarum*, but the species is easily distinguished by its vestiture of crisped brown hairs.

Valsaceæ.

Diaporthe crinigera, Ell. & Ev. Proc. Philad. Acad. (1890) 234. Hermosa, 29 March, on bark of the larger branches of oak.

Valsa boreella, Karst. At Hermosa, 1 April, on dead

twigs of willow; n. 90; growing with *Cytospora boreella*, n. sp.

Valsa ceratophora, Tul. Sel. Carp. ii. 191, t. 22. On dead stems of alder, at Durango, 20 March; n. 91. By the somewhat elongated ostioles, these specimens are more at agreement with Tulasius' figure than are most of the American material that has been referred to the species.

Valsa Lepargyreæ, n. sp. Stromata abundantly scattered, elevating the bark in conspicuous conical pustules; perithecia 12–20 or more in each stroma, buried with no circumscribing line, black, membranous, of cellular parenchyma the cells averaging about 10μ, necks long, the minute, smooth ostioles arranged in a circle about a brown erumpent disc nearly $\frac{1}{2}$mm. in diameter: asci delicate, 8 spored, nearly sessile, 40–50 x 6μ; ascospores continuous hyaline, slightly curved, ends obtuse, 12–16 x 3μ.

On dead branches of *Lepargyrea argentea*, Hermosa, April, 4; n. 92.

Diatrypaceæ.

Diatrype albopruinosa (Schw.) Cke. Grev. xiii. 37. On dead branches of oak at Hermosa, 1 April; n. 27.

Sphæropsidaceæ.

Coniothyrium Eriogoni, n. sp. Pycnidia minute, buried, black, thickly scattered, of loose-cellular parenchyma, cells 6–8μ in diameter, ostioles piercing the epidermis, about 80μ; sporules oval, light yellowish brown, about 6x4μ; sporophores not seen.

On dead stems of *Eriogonum umbellatum*, at Hermosa, 4 April; n. 19.

Coniothyrium Pentstemonis, n. sp. Subsuperficial, without spots; pycnidia scattered, black, membranous, thin-

walled, scarcely ostiolate, 100–200μ; sporules oval or ovoid, continuous, dark-brown, about 7x5μ; sporophores not seen.

On dead leaves and stems of *Penstemon*, at Hermosa, 30 March; n. 20.

Cytospora boreella, n. sp. Stronea elevating the epidermis forming a truncated cone 1mm. in diameter at base and $\frac{3}{4}$mm. high; pycuidial cavities few, 2 or three to 5 or 6 in each stroma with ostioles united in a minute, emergent, black disc, usually crowned by a scanty reddish-orange gelatinous mass of exuded spores; sporules curved, hyaline, 6–8x1$\frac{1}{2}\mu$.

On dead willow twigs at Durango, March 19. Also at Hermosa, 6 April, with *Valsa boreella*; n. 23.

This seems to be the spermagonial stage of what has been called *Valsa borcella* Karst. A similar form on *Salix* from Kansas (N. A. F. No. 3447) has been called *Cytospora nivea*, but our specimens are certainly not connected with *Valsa nivea*. The exuded spore-masses are much the color of those of *C. chrysosperma*, but they are much less copious and do not take the form of a tendril. The spores too are slightly larger than in that species.

Cytospora Corni, West. Lamb. Fl. Belg. ii. 372. On dead twigs of *Cornus*, Durango, Colo., March 20; n. 24.

This agrees with N. A. F. No. 3448 on *Cornus asperifolia* from Kansas, which is named as above. The hard carbonaceous, frequently simple stroma indicates that it belongs in *Centhospora* rather than in *Cytospora*.

Phoma Coloradoensis, n. sp. Pycnidia scattered, rather prominent, but covered by the epidermis and coming away with it, black, lenticular, large, $\frac{1}{4}$mm. or more, of firm cellular parenchyma, the cells 8–10μ in diameter, ostiole papillate, at length broadly perforate; sporules cylindric,

straight or slightly curved, ends rounded, often minutely biguttate, 8–10x3–4μ; sporophores not seen.

On dead stems of *Pedicularis racemosa*, near Pagosa Peak, 6 Aug.; n. 45.

This was previously collected by Mr. Baker on *Pedicularis*, at Four Mile Hill, near Steamboat Springs in Northern Colo., July 22, 1896. It was referred by Ellis to the composite *P. herbarum*. It seems, however, to be sufficiently distinguished from that assemblage of forms by its larger, scattered and not gregarious hycindia. In this vast genus spore characters alone furnish an insufficient guide to the recognition of species.

Phoma Heraclei, n. sp. Pycnidia scattered, prominent, black, subglobose, not collapsing, about $\frac{1}{4}$mm., finally exposed by the shredding away of the thin epidermis, of firm cellular parenchyma, cells 4–6x6–8μ; shorules oval, hyaline, usually with a minute gutta near either end, about 8–10 x6μ.

On dead stems of *Heracleum lanatum*, near Pagosa Peak, 9,000 feet, 20 Aug.; n. 46.

Phoma lupinicola, n. sp. Thickly scattered on large, often slightly whitened areas; pycnidia long covered by the thin epidermis, black, prominent, subglobose, not collapsing, about 150–175μ, membranous, of distinctly cellular parenchyma, cells 6–12μ averaging 8μ in diameter, ostioles simply perforate, the opening about 20μ in diameter; sporules numerous, regularly oval or subcylindric, ends broadly obtuse, quite uniformly with a minute gutta at either end, about 8–10x4–5μ.

On dead lupine stems at Durango, 18 March; n. 47.

Rhabdospora Gutierreziae, n. sp. Pycnidia scattered, buried but finally somewhat protruding through the thin,

whitened epidermis, 80 to 150μ, composed of loose, rounded cells about 8μ in diameter, ostioles inconspicuous; sporules straight or slightly curved, ends obtuse, at first continuous then 1–3 and finally multiseptate, the cells remaining united, 30–50x2–3μ.

On dead stems of *Gutierrezia*, Hermosa, 3 April; n. 77.

Rhabdospora Solidaginis, (C. & E.) Sacc. Syll. iii. 591. On dead stems of *Solidago*, Durango, March 22; also at Hermosa, 1 April; n. 63.

Rhabdospora umbelliferarum, n. sp. Occupying large areas; pycnidia scattered buried, papillate emergent, black, about 200–250μ, soft, of minute rounded cells about 3μ in diameter; sporules acicular, continuous, usually straight, about 35x1μ.

On dead stems of some large umbelliferous plant in a swamp at Hermosa, 6 April; n. 78.

Septoria gaurina, E. & K. Amer. Nat. Nov. 1883. On *Gaura*, Pagosa Springs, 22 July; n. 66. This species seems to have been omitted from Saccardo's *Sylloge*.

Septoria Osmorrhizæ, Peck, Regent's Rep. xxxix. 46. On living leaves of *Osmorrhiza* near Pagosa Peak, 9,000 feet, 18 Aug.

Septoria Symphoricarpi, E. & E. Journ. Myc. ii. 38. On living leaves of *Symphoricarpus*, near Pagosa Peak, 9,000 feet, Aug. 30; n. 67.

Stagonospora cornicola, n. sp. Pycnidia gregarious, in irregular clusters or scattered, buried in the cuticle, the short blunt ostioles finally erumpent, black, firm, smooth, about 200μ; sporules hyaline, at first continuous, finally fainly 3-septate, subcylindric, strongly curved, ends obtuse, about 16x3$\frac{1}{2}\mu$.

On yellowed dead twigs of *Cornus*, at Durango, 20 March. Conspicuous from the yellowed cuticle containing the thickly scattered perithecia which come away with it.

Melanconiaceæ.

Coryneum umbonatum, Nees. Syst. 34. On dead oak twigs, at Hermosa, 29 March ; n. 21.

Dematiaceæ.

Camptoum cuspidatum, Cke. & Hark. Grev. xii. 33. On dead stems of *Scirpus*, Durango, 22 March; n. 17.

Cladosporium typharum, Desm. Sacc. Syll. iv. 366. On dead leaves of *Typha*, at Hermosa, 4 April; n. 18.

Macrosporium puccinioides, Ell. & And. Bot. Gaz. (1891), 47. On dead twigs of *Chrysothamnus*, at Durango, 21 March; n. 34.

This striking fungus can hardly belong in the genus *Macrosporium*. Its compact growth suggests the *Tuberculariaciæ* rather than the *Dematiaceæ*. The only recognized genus of the former family with muriform spores is *Spegazzinia*, but our fungus differs widely from that genus in habit and in that the corridia are not borne on sterigmata but on the ends of the sporophores.

Tuberculariaceæ.

Trimmatostroma Americana, Thüm. Myc. Univ. n. 793. On dead willow twigs, Durango, 20 March; n. 72.

Tuberculariа miniata, n. sp. Sporodoches thickly scattered, erumpent, prominently convex, constricted below, large, 1–2mm., bright salmon red, texture fibrous rather than waxy, in cross section the fertile portion, colored alike

within and without, divided by a distinct darker line from the pale-yellow sterile basal portion; conidiophores very long, somewhat curved, simple, 80–150μ or more by 2μ; conidia borne laterally, oval, hyaline, ends obtuse, about 8x3μ.

Common on dead stems of *Sambucus*, near Pagosa Peak, 9,000 feet, 25 Aug.; n. 73.

This is easily distinguished from *T. Sambucina* by the larger softer sporodoche, the larger thicker conidiophores and the much larger conidia. In specimens of the latter species examined from Europe and from Wisconsin the conidia are only 5–6x1$\frac{1}{2}\mu$.

Tubercularia, sp.? On dead branches of oak, Hermosa' 30 March; n. 74.

This is a very peculiar fungus. The large 2–3mm. sporodoches swarm with motile bacteria-like bodies. The conidiophores seem to be only 8–12x1μ and variously branched or united. The conidia are about 2–3x1μ. It is externally brown, but vermilion-red within, and crumbling to a red powder. It suggests the red stroma of some *Endothia*-like fungus rather than a *Tubercularia*, but no perithecia could be detected.

Lichenes.

By T. A. Williams.

Cladonia fimbriata, Fr. On bare banks at 11,000 feet near Pagosa Peak, Aug.; n. 93.

Cladonia scariosa squamulosa, Muell. Same station with the above, on the ground in spruce woods; n. 94.

Evernia furfuracea, Mann. Near Pagosa Peak at 9,000 feet, on dead standing trunks and branches of spruce; n. 95.

Lecanora cinerea, Sommerf. On granite boulders at Hermosa, March; n. 96.

LECANORA MURALIS SAXICOLA, Schaer. Same station and habitat as the last; n. 97.

LECANORA RUBINA OPACA, Ach. With the two preceding; n. 98.

Parmelia conspersa, Ach. With the foregoing; n. 99.

PLACODIUM ELEGANS, DC. On boulders and ledges at Hermosa, March, forming bright-colored patches often conspicuous at a distance; n. 101.

Rhinodina sophodes EXIGUA, Fr. On dead twigs and branches of juniper and the Douglas spruce at Hermosa, March; nn. 102, 103.

THELOSCHISTES POLYCARPUS, Tuckerm. In bright-colored patches on branches of oak at Hermosa, March; n. 105.

HEPATICÆ.

By L. M. UNDERWOOD.

LOPHOZIA VENTRICOSA, Dicks.

BLEPHAROSTOMA TRICHOPHYLLUM, Dumort. Both these taken together, from a decaying log in a wet spruce wood at 9,000 feet near Pagosa Peak, Aug.; n. 106.

MUSCI.

By N. C. KINDBERG.

BRYUM CÆSPITITIUM, Linn. On the ground at base of trees at Hermosa, April; n. 107.

BRYUM PIRIFORME, Hedw. On the ground, at 9,000 feet, near Pagosa Peak, Aug.; n. 108.

CERATODON PURPUREUS, Brid. About roots of shrubs, at Durango, March; n. 109.

Dicranum rhabdocarpum, Sulliv. At 9,000 feet near Pagosa Peak, Aug.; n. 110.

Dicranum scopariiforme, Kindb. With the last; n. 112.

Distichium capillaceum compactum, B. S. On the ground, in Graham's Park, 7,800 feet, May; n. 111.

Grimmia pulvinata, Sm. On boulders, at Hermosa, March; n. 114.

Hypnum reptile, Rich. On rocks along the river at Graham's Park, May; n. 115.

Hypnum revolutum, Mitt. At 9,500 feet, near Pagosa Peak, Aug.; n. 116.

Hypnum uncinatum, Hedw. River banks in Graham's Park, 7,800 feet, May; n. 118.

Orthotrichum kingianum, Lesq. Moist rocks near Pagosa Peak at 9,500 feet; n. 120.

Philonotis fontana, Brid. On dripping rocks near Pagosa Peak, 9,500 feet, Aug.; n. 121.

Polytrichum alpinum, Linn. In moist subalpine spruce woods about Pagosa Peak, 11,500 feet; n. 122.

Sphagnum teres subsquarosum, Warnst. Margin of a small pond at Cumbres, 10,000 feet, Sept.; n. 123. This was the only *Sphagnum* seen, and the specimens were determined by Warnstorff.

Webera albicans, Sch. At 9,500 feet, near Pagosa Peak, Aug.; n. 124.

Filices.

Asplenium filix fœmina, Bernh. Schrad. Journ. i, part 2, p. 26. At 9,000 feet, near Pagosa Peak, Aug.; n. 125.

CRYPTOGRAMME ACROSTICHOIDES, R. Br. App. Frankl. Journ. 767. At 11,500 feet, near Pagosa Peak; n. 126.

CYSTOPTERIS FRAGILIS, Bernh. Same region, at 9,000 feet; n. 127.

PTERIS AQUILINA, Linn. Sp. 1075. Same region, at 9,000 feet; n. 128.

CONIFERÆ.

Pinus ponderosa scopulorum, Engelm. Chama, N. Mex., 8 Sept.; n. 134.

PINUS FLEXILIS, James, in Long's Exp. ii, 27, 35. Graham's Park, 8,700 feet, May; n. 133.

Picea Engelmannii, Engelm. At 9,000 feet, near Pagosa Peak; n. 131.

PICEA PUNGENS, Engelm. in Gardn. Chron. (1879) i, 334. Chama, N. Mex., at 7,800 feet, Sept.; n. 132.

Abies concolor, Parry. Near Pagosa Peak, Aug.; n. 129.

Pseudotsuga taxifolia, Britt. Near Pagosa Peak, Aug.; n. 135.

Juniperus monosperma, Sarg. Aztec, N. Mex., April; n. 130, distributed as *J. occidentalis*.

TYPHACEÆ.

Typha latifolia, Linn. Flowering specimens from Pagosa Springs, 31 July; n. 136; of this species, nominally, but the spikes are too long and narrow. *T. latifolia*, so-called, in North America, is doubtless an aggregate. But the needed segregations can not be made on herbarium material always incomplete.

SPARGANIUM ANGUSTIFOLIUM, Michx. Fl. ii, 189. At 1,000 feet, mountains, near Pagosa Peak, 15 Aug., in flower only; n. 137.

ALISMACEÆ.

ALISMA BREVIPES, Greene, Pitt. iv, 158. Piedra, 12 July; n. 138.

GRAMINEÆ.

There is perhaps no section of the Middle West which presents more interesting or important agrostological problems than does this field of our 1899 explorations and researches. The pasturage is almost everywhere here most excellent; and even the alpine grassy slopes of vast extent far above the limit of trees are converted into a sheep pasture. And the still richer Piedra Meadows are famed throughout the whole southern Rocky Mountain region. The less elevated and more arid parts of the country have also their own grass flora of much importance, and this section in particular calls for careful investigation and experimentation in relation to the preservation and propagation of its forage plants.

In the determination of the species of the following list, invaluable service has been rendered by Mr. F. L. Scribner, to whom a set of specimens was sent for identification, and by the late Mr. T. A. Williams. Later Mr. C. L. Shear furnished some importnnt additions and corrections. The bibliographic citations and one or more alterations in nomenclature have been supplied by Dr. Greene. The somewhat extensive field notes are my own.

CARL F. BAKER.

PANICUM CAPILLARE, Linn. Sp. 58. In stony dry river bed at Piedra, Colo., 14 July.

HIEROCHLOE ODORATA, Wahlenb. Fl. Ups. 32. In damp shady places at Los Pinos, 21 June; also on rocky river bank at Arboles, 9 June. This was distributed under the generic name *Savastana*; but the editor of these Catalogues does not see how people who hold the law of priority to be fundamental, can consistently adopt *Savastana*, over which *Hierochloe* holds priority by more than forty years.

ARISTIDA LONGISETA, Steud. Syn. 420. Common in large tufts in dry ravines at Rosa, N. Mex., June; n. 152, issued as *A. purpurea*.

Aristida purpurea, Nutt. var. FENDLERIANA, Vasey. On stony mesa banks at Arboles, May; n. 153. Also a low inconspicuous form common in dry pine groves at Los Pinos, May; n. 154. Both numbers were distributed simply as *A. purpurea*.

STIPA MINOR, Scribn. Bull. Agrost. xi, 46. At Cumbres Pass, Colo., at 10,000 feet, Sept.; n. 218. The high open country at this point is a continuous meadow of many grasses, and this species is among the most conspicuous. Although many thousands of sheep and cattle are yearly pastured here, this grass, like the other *Stipa* species, remains untouched. Other specimens of the species are from Chama, N. Mex.; n. 219.

STIPA TWEEDYI, Scribn. l. c. 47. Arboles, June; n. 220.

STIPA VASEYANA, Scribn. l. c. 46. Abundant in tufts on dry open ground at Pagosa Springs, July; n. 221.

STIPA VIRIDULA, Trin. Mem. Acad. Petr. Ser. VI. ii. 39. Gato, Colo., on railway embankments, but not plentiful; n. 222.

Oryzopsis micrantha, Thurb. Frequent in small bunches,

especially along the borders of thickets, and along river banks at Arboles, June; n. 190.

Eriocoma cuspidata, Nutt. Gen. i. 40. Arboles, June; n. 189. One of the very earliest of vernal grasses. At Hermosa, where, among the dry hills and sandy banks, it is common, we found it in March, showing a short growth of fresh green leaves that seemed to be eagerly sought by cattle. The species is catalogued in Pl. Baker. i. 42, as *Oryzopsis cuspidata.*

Muhlenbergia affinis, Trin. Mem. Acad. Petr. Ser. VI. ii. 301. Common at Chama, N. Mex., Sept., forming large tufts; n. 187.

Muhlenbergia comata, Benth. & Hook. Gen. Pl. iii. 1144. Common in dry beds of streams, forming large tufts, at 9,000 feet, near Pagosa Peak, Aug.; n. 188. Also collected at Arboles, 28 June.

Phleum alpinum, Linn. Abundant in all alpine meadows, at 12,000 feet, near Pagosa Peak, Aug.; n. 194.

Phleum pratense, Linn. In meadow lands about Pagosa Springs and at Arboles, July; n. 195.

Alopecurus geniculatus, Linn. Sp. 60. Common in wet and subalkaline soils along the river at Arboles, June; n. 151.

Sporobolus airoides, Torr. Aztec, N. Mex., May; n. 212; and at Arboles, Colo., June; n. 213. A common bunch grass of dry lands.

Sporobolus confusus, Vasey, U. S. Herb. i. 56. Occurring in extensive patches on otherwise barren, dry, stony beds of streams at Piedra, July; n. 214.

SPOROBOLUS CRYPTANDRUS, Gray, Man. 576. Chama, N. Mex., Sept.; n. 215.

SPOROBOLUS DEPAUPERATUS, Scribn. Bull. Torr. Club, ix, 103. Arboles, Colo., June; n. 216; Chama, N. Mex., Sept.; n. 217; here quite common on shelving sand banks.

BLEPHARONEURON TRICHOLEPIS, Nash, Bull. Torr. Club, xxv, 88. A common grass, in small tufts, on ledges and in open ground at 9,000 feet, near Pagosa Peak, Aug.; nn. 155, 156. It was also found in a rocky river bed at Piedra, 14 July.

AGROSTIS ALBA, Linn. Sp. 63. A few specimens were collected in low land at Arboles, 28 June.

Agrostis exarata, Trin. A common grass in open places and along the borders of thickets, at about 9,000 feet, near Pagosa Peak, Aug.; n. 146. A smaller, weaker state of the species was collected at about 10,500 feet, and issued under n. 147.

Agrostis hyemalis, BSP. Near Pagosa Peak, at 10,000 feet, Aug.; n. 148. Pagosa Springs, July; n. 149. This is a very common grass in all moist places throughout the whole region.

AGROSTIS TENUICULMIS ERECTA, Nash. Found in but one locality, forming a large mat on an exposed ledge, at 10,500 feet, near Pagosa Peak, Aug.; n. 150.

CALAMAGROSTIS CANADENSIS ACUMINATA, Vasey. At 10,000 feet, near Pagosa Peak, Aug.; n. 160. Specimens from 9,000 feet, in the same mountains were distributed under n. 161. Those from the higher elevation were of less luxuriant growth, and the panicles were often deeply colored.

CALAMAGROSTIS SCOPULORUM, Jones, Proc. Calif. Acad. 2 Ser. v. 722. Near Pagosa Peak, at 9,000 feet, August.

Deschampsia cæspitosa, Beauv. Pagosa Springs, July; n. 165; these specimens large and with pale panicle; common in the meadows. Near Pagosa Peak; nn. 166, 167, 168; all highly colored alpine forms obtained at from 11,500 to 12,000 feet. An uncommonly long-awned alpine variety was issued under n. 170.

TRISETUM MONTANUM, Vasey, Bull. Torr. Club, xiii. 118. Common on moist open slopes near Pagosa Peak, at 9,000 feet; n. 223.

Trisetum subspicatum, Beauv. Near Pagosa Peak, at 9,000 feet, Aug., in small tufts on exposed ledges; n. 224. A taller state with more open panicle was found in soil more rich and moist.

DANTHONIA INTERMEDIA, Vasey, Bull. Torr. Club, x. 52. A reduced alpine form, common on grassy slopes at 12,000 feet near Pagosa Peak; n. 164. A much taller and well developed form occurs on the lower open slopes.

SCHEDONNARDUS PANICULATUS (Nutt.), Trelease. Arboles, June; occasional, on dry ground.

Bouteloua curtipendula, Torr. At Rosa, N. Mex., in small mats on the stony mesa lands; rather common, and closely cropped by sheep and goats; also seen at Arboles, Colo.

BOUTELOUA PROSTRATA, Lag. Gen. & Sp. 5. Common along the borders of low alkaline sinks, at Chama, N. Mex., Sept.; n. 163.

Beckmannia erucæformis, Host. A small form of this was taken in moist ground at Pagosa Springs, 28 July.

EATONIA OBTUSATA, Gray, Man. 2 ed. 558. At Pagosa Springs, July; n. 169; also at Arboles, June; n. 171.

Kœleria cristata, Pers. Pagosa Springs, July; n. 184; Arboles, June, 185. Common and conspicuous in dry open lands.

Melica parviflora, Scribn. Abundant on open mountain sides at 9,000 feet, near Pagosa Peak, Aug.; n. 186.

Poa alpina, Linn. At 10,500 feet, near Pagosa Peak, and common at such altitudes, Aug.; n. 196.

POA BREVIFOLIA, Muhl. Gram. 138. Common on hillsides in pine woods, especially on ground moistened by seepage from irrigation ditches at Los Pinos, May; n. 197.

Poa epilis, Scribn. Common on alpine slopes at 11,500 feet, near Pagosa Peak, Aug.; n. 198.

Poa Fendleriana, Vasey. Near Pagosa Peak at 11,500 feet, Aug.; n. 199. And a form said to approach the var. *Arizonica* was obtained at Los Pinos and issued under n. 200.

POA FLEXUOSA, Muhl. Gram 148? Near Pagosa Peak at 10,500 feet, Aug.; n. 201.

Poa leptocoma, Trin. Near Pagosa Peak, Aug. Two forms were issued; a slender weak plant from 9,000 feet, as n. 202, and a stout one from 11,500 feet as n. 203.

POA LONGILIGULA, Scribn. in Beal, Grasses, ii. 532. Aztec, N. Mex., May; n. 204. It was surprising to find; at so early a date, large fresh bunches of this grass, approaching maturity on the dry mesa banks. It would undoubtedly be a grass of great value if amenable to cultivation in this its native region. But no attempt seems to have been made in

this direction, although there is an agricultural experiment station at this very point.

Poa longepedunculata, Scribn. Near Pagosa Peak, at 12,000 feet, Aug. Two varieties were distributed, nn. 205, 206, both common on alpine grassy slopes.

Poa nemoralis, Linn. Near Pagosa Peak at 10,000 feet. 18 Aug. A form very near to *P. rupestris* was issued as n. 207, this from an altitude of about 12,000 feet.

Poa occidentalis, Vasey. At 9,000 feet, near Pagosa Peak.

Poa pratensis, Linn. Near Pagosa Peak at 9,000 feet, Aug.; n. 308. What have been determined as varieties of this species were obtained at Los Pinos in May, and at Pagosa Springs in July; but that they are specifically identical with the mountain plants seems a strange proposition.

Poa reflexa, Vasey & Scribn. U. S. Herb. i. 276. No. 209 is said to be a form of this with short leaves and rather large spikelets. It is common at about 12,000 feet, near Pagosa Peak.

Poa vaseyana, Beal, Grasses, ii. 532. Habitat of the last, at about 11,500 feet; n. 209; said to be larger and more robust than the type, with rougher foliage and sheaths, large and more acute as well as more woolly-pubescent glumes.

Graphephorum muticum. *Trisetum muticum*, Scribn. Bull. Agrost. xi. 50. Occasional in damp spruce woods at Cumbres, Colo., 10,000 feet, Sept.; n. 180.

Panicularia nervata, Kuntze. Pagosa Springs, Arboles and Piedra, June and July; n. 191. Also in two more or less dissimilar states from near Pagosa Peak, Aug.; n.

193, of small size and with drooping panicles; n. 194, large and strong, with long leaves and erect panicles.

FESTUCA ARIZONICA, Vasey, U. S. Herb. i. 277. Cumbres Pass, 10,000 feet, Sept.; n. 173. Pagosa Springs, July; n. 174. Also in dry river bed at Piedra, July. A common bunch grass wherever it occurs.

FESTUCA BREVIFOLIA, R. Br. in Parry 1st Voy. Suppl. Near Pagosa Peak, Aug. Two forms were distributed: n. 175 from 12,000 feet, and n. 176 from 11,500 feet. Both are common on the open alpine slopes and summits; and they have been determined as unquestionable *F. brevifolia* by our agrostologists, which is interesting in view of Dr. Theo. Holms' statement that the true *F. brevifolia* is not known to occur below the Arctic Circle.

FESTUCA FRATERCULA, Rupr. Bull. Brux. ix. (2) 236. Near Pagosa Peak, 9,000 to 9,500 feet, Aug. Two forms were distributed, nn. 177, 178, both abundant on rich, open slopes among the spruce woods, and both occurring either singly or in small tufts.

Festuca Thurberi, Vasey. Forming compact tufts on open slopes at 10,000 feet near Pagosa Peak; Aug.; n. 179.

Bromus Porteri, Nash. At Arboles; June; nn. 157, 159. No. 157 was issued erroneously as *B. occidentalis.*

BROMUS RICHARDSONII, Link. Hort. Berol. ii. 281. Near Pagosa Peak at 9,000 feet, Aug.; n. 158. A tall and graceful plant very abundant on all the open slopes of the Pagosa Peak region.

AGROPYRUM DIVERGENS, Nees, ex Steud. Syn. 347. Frequent in small tufts in an old creek bed near Pagosa Peak, at 9,000 feet; Aug.; n. 139; not typical.

Agropyrum pseudorepens, S. & S. Bull. Agrost. iv. 34. At 9,000 feet near Pagosa Peak; n. 140.

AGROPYRUM SPICATUM, S. & S. l. c. iii. 12. Arboles, June; n. 142. A grass of very different aspect, with large, thick spikes, but said to be specifically identical with the other, was obtained at the Cumbres Pass in Sept.

Agropyrum Scribneri, Vasey. At 12,000 feet near Pagosa Peak, Aug.; n. 141. Frequent, and forming mats on open alpine slopes, the culms from almost erect to nearly prostrate.

Agropyrum tenerum, Vasey. Arboles, June; nn. 144, 145. Also found in a dry creek bed near Pagosa Peak at 9,000 feet, 10 Aug.

Agropyrum violaceum, Vasey. A common bunch grass of the highest alpine slopes near Pagosa Peak, Aug.; n. 144a.

HORDEUM JUBATUM, Linn. Sp. 85. Common in low meadows at Arboles, June; n. 183.

Elymus glaucus, Buckl. At 9,000 feet near Pagosa Peak, common; n. 172.

SITANION ELYMOIDES, Raf. Journ. Phys. (1819) 103. Arboles, June; n. 211.

SITANION LONGIFOLIUM, J. G. Smith, Bull. Agrost. xviii. 18. At 9,000 feet near Pagosa Peak, Aug.

Hilaria Jamesii, Benth. On stony declivities of the mesas at Arboles, June; n. 182; and at Aztec, N. Mex., May; n. 181.

PLANTÆ BAKERIANÆ

By EDWARD L. GREENE

AND OTHERS.

VOLUME III.

FASCICLE I.

INDEX OF GENERA.

Price, Fifty Cents.

ITINERARY.

Plans for the summer months of 1901 embraced an examination of the flora of the Gunnison watershed, including the region from Marshall Pass to Grand Junction, with the valleys and hills adjoining the Gunnison River and its principal tributaries. This region has a northwest and southeast extension in west central Colorado and includes areas of very diverse character, both topographical and geological, and the flora varies accordingly. The drainage area is a part of that of the Colorado River and its waters eventually reach the Gulf of California.

The region is separable into three distinct areas: The High Mountain Area, the Foothill Area, and the Desert Area. On the extreme east lies Mount Ouray and its companion peaks; to the north the Elk Mountains of numerous very high and often jagged peaks, and to the south the Cochetopa Mountains—less lofty and more often with rounded, grassy summits. The above, with that portion of the San Miguel Mountains about the headwaters of the Uncompahgre River, a tributary of the Gunnison, and the Grand Mesa, compose the High Mountain Area of this region.

All that country between Jack's Cabin, Sargent's and Lake City on the one hand, to Cerro Summit and Ridgway on the other, may be classed as Foothill Area. This is a country of comparatively low, rounded hills and narrow valleys, the hills covered with sage brush and scattering pine and spruce, the valleys with alder, willow and cottonwood along the streams, and with frequent rich meadows.

Passing down the Gunnison, the river just below Sapinero

enters the rocky gorge of the Black Cañon. This is passable for the Rio Grande Railroad for fifteen miles to a point near Cimarron, where the Cimarron River enters from the south. Here the railroad is compelled to climb up through Cimarron Cañon and over Cerro Summit to seek a western outlet by way of the Uncompahgre Valley to Delta, which is again on the Gunnison. From Cimarron to near Delta the Gunnison runs through its Grand Cañon, so deep and narrow and with such precipitous walls as to be quite inaccessible.

Passing westward from Cerro Summit, the change in character of country and of flora is one of the most sudden and most remarkable in the State of Colorado. Cerro Summit is a huge hill covered with thickets of oak scrub and Amelanchier (scattering other shrubs) and supplied with a rich herbaceous vegetation. A few miles to the westward and a few hundred feet below, say at Cedar Creek, one is in the Desert Area, with cedars, piñon, *Sarcobatus*, *Atriplex*, and a characteristic desert flora. From this point to the west end of the Grand Mesa, the broad Uncompahgre Valley was originally almost an utter desert. It is flanked on either side with adobe hills or gravelly mesas, sparingly clothed with cedars or entirely naked, the bottoms with *Sarcobatus* and its companions, and along the stream willows and cottonwoods.

From Delta to Grand Junction the Gunnison runs through its Lower Cañon which is broader and shallower than the Grand Cañon and flanked by barren and broken sandstone hills, in some places closely resembling the Colorado Cañon formation. A collection of the curious flora of this hot, dry Lower Cañon was made within seven miles of Deer Run. At Grand Junction the Gunnison passes into the broad valley of the Grand River, which is also desert

where unirrigated. Below Grand Junction the lowest altitude in the State is reached.

In the High Mountain and Foothill* Areas the rocks are quite largely metamorphic and the soils are constituted accordingly. In the Elk Mountains near Crested Butte and Ruby there are extensive outcroppings of slate and coal. In these mountains collections were made at Crested Butte, Rogers, Keblar Pass and Ruby.

The Elk Mountains are a wonderful range of high, closely set, jagged peaks, well watered, richly clothed with spruce forests and other vegetation—undoubtedly richer in this respect than any other mountains of Colorado. They are remote, rarely visited, and together form the richest and most promising high-mountain botanical field in the State. Deep forests, meadows, open glades and parks, dripping cliffs, and springs and streams everywhere, altogether furnish a most remarkable field for plants of all groups.

Later on when our Botanical Gardens and Universities establish their substations for Experimental Ecology and similar work, there should certainly be one here.

In the High Mountain Area collections were also made at and near Marshall Pass, at Carson in the Cochetopas, at Ouray and on the surrounding hills in the San Miguels, and on the summit of the Grand Mesa.

In the Foothill Area, collections were made at Jack's Cabin, Sargent's, Doyle's, Gunnison, Iola, Sapinero, the Black Cañon, Cimarron, at Van Boxle's Ranch above Cimarron, on Poverty Ridge near Cimarron, on the Black Mesa at the head of Crystal Creek, and on Cerro Summit.

In the Desert Area collections were made at Cedar Creek, Montrose, Cedar Edge, Deer Run, and Grand Junction.

* This term may be objected to as not equivalent to the Foothills on the east slope. But neither would the Desert Area here be equivalent to the Plains on the east.

While the localities given are not many in number, still, around them and between them a good deal of ground was covered. Tramps were made around each point for a radius of several miles and most places were visited more than once during the three months. Walks were also made between Ruby and Keblar Pass, between Keblar Pass and Crested Butte (seven miles), between Crested Butte and Jack's Cabin (fifteen miles), between Marshall Pass (alt. 10,800 ft.) and the top of Mount Ouray (14,000 ft.), and to the top of Little Ouray, between Lake City (8,000 ft.) and Carson (11,500 ft.) and return (thirty-two miles), between Cimarron and top of Poverty Ridge and return (ten miles) three times, between Cimarron and the Black Mesa and return (sixteen miles), four times between Cimarron and Cerro Summit (five miles), through the fifteen miles of the Black Cañon three times, from Cerro Summit to Cedar Creek (seven miles) from Grand Mesa Lakes to Cedar Edge (seven miles), from Telluride to Ouray (twenty miles, over a divide rising to 13,500 ft.), and between Deer Run and Kanah Creek (seven miles) three times. This is over and above the local work around all the points mentioned. So the plants obtained will represent the phanerogamic flora fairly well. Getting into the field so late and doing all the work alone made it impossible to give the necessary attention to the collection of the cryptogams. But the region is rich in them. The fleshy forms were noted especially in the Elk Mountains, where they were abundant even up into the highest timber. Such fungi and mosses as intruded themselves on the attention were collected.

Two points in the subalpine country should be especially noted—the Grand Mesa and Van Boxle's Ranch. The Grand Mesa is a high elongated plateau extending northwesterly from the West Elk Mountains to the Gunnison

below Delta. It is a remarkable place. The top is well watered, with many streams and beautiful lakes and with rich forests and open parks. About the base lies the desert. The Grand Mesa can be readily reached by a twenty-five mile drive from Delta.

Van Boxle's Ranch is twelve miles above Cimarron on the headwaters of the Little Cimarron. One could scarcely find a richer or more beautiful mountain locality than this, surely not one more remote or less known. Splendid trout fishing is not one of the least of the many attractions.

Here should be detailed those plants which were observed but for various reasons were not collected. The high spruce woods were composed almost entirely of *Picea Englemanni* and *Pseudolsuga*. Along the lower border of the spruce are extensive thickets of quaking aspen, some of the trees often reaching very good size. Here, also, in favorable places bear berry (*Arctostaphylos uva-ursi*) is common. Throughout the foothill and mountain country *Alnus* was frequent along the streams, and the red-berried *Sambucus* was occasional in the higher altitudes. The scrub oak thickets so common in the foothill country have already been mentioned. Wet swales in the lower altitudes were usually filled with *Typha*, and often contained colonies of *Scirpus occidentalis*. One of the poison oaks (*Rhus*) was common in the bottoms throughout the lower altitudes, but extreme susceptibility, induced by a most troublesome experience in the swamps near Mobile, Alabama, led me to give it a wide berth. Again cattle were seen browsing it, apparently with relish. *Helianthus petiolaris*, *Plantago major*, *Salsola kali*, *Solanum nigrum*, *Xanthium strumarium*, *Amarantus blitoides*, and *A. retroflexus*, occurred on almost all cultivated areas, along roads and railroads, and in railroad yards. In the Gunnison Valley the Russian Thistle

is almost entirely confined as yet to the yards and along the right of way of the railroad. The section men have instructions to destroy it, but it was found that few of them were acquainted with it. In its younger states it is soft and succulent, and cattle and horses eat it freely. *Humulus lupulus* occurs occasionally in the bottoms, and a few plants of *Panicum crus-galli* were seen at Grand Junction. *Cereus phoeniceus* and one of the ordinary yellow-flowered prickly pears are common throughout the foothill country. On gravelly hillsides in the Desert Area, *Opuntia arborescens* is not uncommon. *Phleum alpinum* and *Poa alpina* were abundant throughout the alpine region. A few immature plants of *Melica bulbosa* were seen on Poverty Ridge. Above Ouray a few plants of *Artemisia franserioides* were observed.

The agricultural possibilities of this region as it is described above would not appear very promising. On the contrary, they are very great. Even the naked adobe soil possesses a wonderful fertility and requires but water to make it yield richly. Even now there are ranches where small ditches could be taken out, all along the Gunnison except in the narrow cañons, and likewise along the Uncompahgre. Near Crested Butte (8,878 ft.) the altitude is too great for common garden vegetables and fruits, but the natural meadows in the vicinity, full of native grasses and sedges, have been improved and produce heavily. At Jack's Cabin (about 8,300 ft.), fifteen miles below Crested Butte one may see beautiful fields of alfalfa and timothy, and here are raised radish and lettuce and other very hardy and quickly maturing garden vegetables. Sargent's (between Gunnison and Marshall Pass) is much like Jack's Cabin in this respect. Doyle's, between Gunnison and Sargent, was found to be a very interesting locality on account of the considerable percentage of alkali in the bottom's soil. The meadows here

were consequently not as rich and were overrun with the worthless, even injurious, grass locally known as "fox-tail." A number of distinctly halophytic plants were present such as *Trigloclin maritima* and a *Plantago.*

At Gunnison (7,680 ft.) are some beautiful meadows, though many are filled with a most astonishing array of native plants. When these are in bloom, the Erigerons, Pedicularis, Castilleias, Crepis and many others, present a very beautiful sight. Barley, oats and red clover do well here, and better examples of radish, lettuce, carrots, turnips, potatoes, rhubarb, cabbage, etc., would be hard to find. It is probable that some of the small fruits would prove a great success at this point.

Coming down out of the foothill country and entering the desert above Montrose, one finds beautiful orchards and broad green fields where the ground has been irrigated, and portions now have the appearance of a prosperous agricultural district. It is, however, near Delta (about 5,000 ft.) and neighboring towns that the fruits are grown to greatest perfection. Here are produced pears, peaches, apples, plums, cherries and other fruits which cannot be excelled. Grand Junction is also the center of a great fruit country.

There is, in this Gunnison region, a vast natural supply of water from the high mountains and vast areas of land which that water may yet be carried to in ditches, so that the possibilities before the region are almost unlimited. The day is coming when the lower Gunnison valley, now largely a desert, will be one of the richest agricultural regions in the United States.

Thousands of sheep are pastured during summer in the lower foothills. Higher up many cattle may be found, though there is rich unoccupied range for many times the number now there.

The field work, all done between June 1st and September 1st by one person, resulted in the collection of above 25,000 specimens with notes on each species. Also, photographs were taken of all the characteristic ecological associations. As in previous years the work would have been largely impossible but for the co-operation and encouragement of Dr. E. L. Greene, whose remarkable knowledge of the American field directed operations in these most remote localities, even to definite hills, valleys and meadows.

Here also should be acknowledged the great kindness of Mr. E. T. Jeffery, President of the D. & R. G. System, and of other officials of the Road, without whose assistance some of the work would have been quite impossible. A faithful boy, Ed. Dundin, did the camp work, and most of the changing of driers, though the work of first, putting plants into press, taking out those finally dried, cleaning, bundling, writing labels and separating a study set, necessarily devolved on the collector.

Carl F. Baker.

Stanford University, California.
15 Oct., 1901.

Explanatory.

Mr. Bakers' botanical exploration of the Gunnison Watershed in the summer of 1901, has already proven a remarkable success, both as to the number and quality of the specimens; while the wealth of new species is even greater, I think, than was obtained in other sections of southern Colorado either by Mr. Baker in 1899, or by Baker, Earle and Tracy in 1898. Many of the new things in those two earlier collections are still unpublished; this being largely due to my having undertaken to publish full lists of those collections, and in due taxonomic sequence.

Pending the completion of volumes I and II of the Plantæ Bakerianæ, I propose giving, as a first instalment of volume III a somewhat miscellaneous congeries of paragraphs dealing with new or otherwise interesting species; in this absolving myself from the obligation—more fanciful than real—of following any particular sequence of Families. Any difficulty which this want of order may seem to entail upon students of the sets, will be obviated by an index to the genera treated, if not even to the species.

Edw. L. Greene.

Catholic University of America.
21 Oct., 1901.

Ranunculaceæ.

Ranunculus eremogenes, Greene, Eryth. iv. 121. Abundant in a small pond within the Black Cañon, n. 204; quite typical. In publishing this interesting analogue of

the Old World *R. sceleratus*, I credited it to no station more southerly than middle Colorado. The present record would therefore be a considerable extension of its range. But my herbarium shows that I myself collected it in 1889 as far south as Trinidad, on the extreme southern verge of Colorado. Mr. Heller has more recently distributed it from Rio Arriba Co., New Mexico; and I may here note that in 1898 I found plenty of it along the muddy margin of a lake in southern Minnesota not far from Windom, this being its most easterly habitat so far as known.

Ranunculus eremogenes, var. pilosulus. Much smaller than the type, with several subequal ascending stems 5 or 6 inches high; herbage of a deeper green and sparsely pilose-pubescent; receptacle, heads and achenes much as in the type, but all smaller.

In damp places above Gunnison, 17 July, n. 454. Quite different, except as to height and mode of growth, from my var. *degener* of the same species.

Ranunculus Purshii, Richardson. Fine large specimens, growing in ponds near Gunnison, n. 669; differing from the high-northern type in failing to show the very narrowly dissected submersed leaves. A so-called "*R. Purshii*" of Mr. Baker's collecting at Fort Collins, Colo., in 1896 is clearly *R. eremogenes*.

Ranunculus unguiculatus, Greene, Pitt. iv. 142. Two numbers of this, both from the Grand Mesa; 228, much smaller than the type specimens and too young; 234 is more mature, and large enough to represent the species well.

Ranunculus oreogenes. Of the size and habit of *R. ellipticus*, with even larger and coarser roots, but foliage of dif-

ferent form and texture, being much firmer and scarcely ucculent, the lowest leaves narrowly ovate-lanceolate, those next succeeding them linear-elliptical, the blades about 1½ inches long, the petioles about as long, the mostly solitary cauline like the others but closely sessile, all vivid-green and reticulate-venulose above, pale beneath, even whitish, all perfectly entire; scapiform peduncles decumbent, simple and 1-flowered, or with one or two 1-flowered branches: calyx and corolla not seen: head of achenes ovate; achenes pubescent, the body suborbicular, the beak rather prominent, curved.

At Cerro Summit above Cimarron, 7 June, n. 50; occuring on open hillsides, but past flowering.

In addition to the above, the collection exhibits the following less noteworthy Ranunculi: *R. reptans*, Linn., n. 464; *R. inamœnus*, Greene, nn. 235, 350; *R. Macounii*, Britt., n. 562, and *R. Macauleyi*, Gray, n. 319.

Batrachium trichophyllum, Bossch., n. 320.

Cyrtorhyncha rupestris. Stems very slender and few-flowered, more than a foot high; biternate foliage ample and of more than half the height of the stems; flowers mostly only 5 or 6, on long slender pedicels and very small: petals about 5, variable, some obovate and sessile, others (transitional to stamens) with smaller blade and long claw: achenes few, short and of almost elliptic outline, the ribs prominent, but more or less confluent and inclined to form narrow reticulations.

On moist cliffs in the Black Cañon, 20 June, n. 198. An excellent new species of an interesting genus, this has the aspect of *C. neglecta*, of northern Colorado, but not at all either its flowers or fruits.

Caltha chionophila, Greene, Pitt. iv. 80. Two representations of this; n. 227, from the Grand Mesa, shows constricted but not dentate foliage, while n. 408, from Carson, has the leaves smaller, more rounded, and notably dentate.

Trollius albiflorus, Rydb. Fl. Mont. 152. Under n. 221 we have excellent flowering specimens of this fine plant which Mr. Rydberg has well separated altogether, in name and rank, from *T. laxus*.

Delphinium Nelsonii, Greene. On open hillsides at Cerro, n. 52, the usual form; n. 216, the largest and most showy specimens yet seen, said to be abundant in open parks at Van Boxle's, above Cimarron.

Delphinium dumetorum. Near the last, but more slender and commonly 2 feet high or more; leaves remote and with fewer and broader segments; herbage glabrous; ramifications of the root more slender and disconnected: flowers smaller and less widely expanding, though with spur longer and more slender, acutish and strongly curved downward at the end, the color of the whole flower a pale lavender-blue: follicles puberulent, shorter and more widely spreading than in *D. Nelsonii*.

On dry hills, among shrubbery above Cimarron, 6 June, n. 35; growing quite apart from *D. Nelsonii*, which occupies open grassy ground at higher elevations.

Delphinium quercetorum. Resembling *D. glaucum*, perhaps as tall, with equally leafy stem and narrow condensed raceme; herbage pale and glaucescent, but only the stem and petioles truly glabrous, the leaves villous-puberulent, their 3 to 5 segments broad-cuneiform and 3-lobed, not toothed; rachis of the spike strongly hirtellous, the pedicels

most so, and the hairs of these viscid and mostly gland-tipped: small flowers very dark blue-purple, the sepals rugulose and together with the slender-conical turgid straight ascending spur rather rough-hairy: ovaries densely villous.

Common among oaks at Cerro, 12 July, n. 412. At first glance this appears much like true *D. glaucum*, though the leaves are much less divided than is usual in that species, and the flowers are much darker; but a lens reveals the abundant short-hairiness of the foliage; and the even stronger pubescence of the rachis is of a character quite peculiar. Moreover, this is a dry-land plant, whereas *D. glaucum* grows only in wet places.

ACONITUM BAKERI. Stem stoutish, erect, simple and rather strict, 2 feet high, the whole upper portion of the plant, even to the flowers, villous hirsute with brownish hairs, some of them gland-tipped: lower parts glabrous, the lowest leaves 5-parted and the cuneate divisions doubly about 3-cleft: raceme compact: hood $\frac{3}{4}$ inch high, the galeate portion rounded, scarcely higher than broad, much shorter than the downward portion, the beak broadly subulate, projecting horizontally; follicles about 4, glabrous.

At 10,000 feet near Marshall Pass, 19 July; said to be common in wet places. The only American species with dense almost spicate and strict inflorescence, the sepals and petals remarkably pubescent. It is the only Aconite of this year's collection.

CRUCIFERÆ.

DRABA GRAMINEA. Perennial, the much branched stems 3 to 5 inches high, the older portions thickly clothed with long dry chaffy remains of the leaves of other seasons: leaves of the season linear and grassy, almost as long as the

short-peduncled loose and rather few-flowered racemes, glabrous above the middle, but below it loosely ciliate with simple hairs: sepals yellow; petals pale-yellow: filaments abruptly and widely dilated at base; young pods ovate, acute, surmounted by a conspicuous style, few-ovuled.

A most remarkably chaffy and grassy-looking *Draba* of alpine habitat, found near Carson, 2 July, n. 296. Its nearest affinity would seem to be *D. chrysantha.*

Draba oxyloba. Perennial, tufted, the several and quite simple flowering stems or branches decumbent, leafy to near the middle, thence racemose, 8 to 18 inches high; foliage and stem not at all canescent, scarcely even pale, nevertheless roughened everywhere by an sparse indument of sessile and uniformly 4-parted hairs: basal leaves 1 to 2 inches long, oblanceolate, petiolate, remotely dentate or else entire, the petioles, at least near the base, with a few scattered marginal simple and setaceous hairs; cauline leaves ovate to oblong-lanceolate, commonly near an inch long, sessile, dentate: sepals and petals both golden-yellow, the former with scattered short mostly simple (rarely forked) hairs: pods not twisted, oblong-linear to elliptical, 4 or 5 lines long, acute at each end, pointed with a style of less than one line; pedicels slightly ascending, longer than the pods.

At Van Boxles' Ranch above Cimarron, in open parks, n. 382; also at Sargents, in meadows, n. 351; distinguished from all its allies by a pubescence of cruciform hairs.

Draba Bakeri. Rather slender yellow-flowered perennial, the several erect stems 4 to 10 inches high: tufted radical leaves about an inch long, oblanceolate, short-petiolate, entire, acutish, cinereous, at least when young, with

stellate pubescence, the stem and inflorescence greener, the pubescence more sparse, mostly of forked or 3-branched hairs, but with some much longer and perfectly simple ones interspersed: cauline leaves lanceolate, serrate-toothed, sessile: fruiting raceme loose, with leafy bracts subtending the lower pedicels: flowers small; sepals green, notably bristly-hairy at apex; petals yellow, scarcely twice the length of the sepals: pods erect, short-pedicellate, narrowly elliptical, pubescent on the face with more or less forked and appressed hairs, but the margins quite hirsutulous with mostly simple ones: style short.

Near the limit of trees, in the mountains near Carson, n. 316. An ally of *D. streptocarpa*, the pods doubtless more or less twisted when mature.

Draba nitida. Annual, very erect and strict, simple or with a few shorter racemes from near the base, the whole plant often 10 to 14 inches high, racemose almost from the base, and, except at base, glabrous, deep-green and shining: leaves in a comparatively small radical tuft, the longest barely an inch long, oblong-lanceolate, obtuse, entire, the outer narrowed at base but hardly petiolate, sparsely substellate-pubescent, the margins loosely bristly-ciliate; cauline few, oblong-ovate, entire, sessile: pedicels 3 or 4 lines long, ascending, the oblong-linear acutish often somewhat incurved glabrous pods about as long: flowers small, yellow, the green sepals more or less pilose, as is also the base of the stem: style none.

Abundant on moist open ground at 10,000 feet above Marshall Pass, 19 July, n. 492. A less luxuriant state of the same was collected, also by Mr. Baker at Cameron Pass, northern Colorado, at 9,800 feet, in July, 1896. The plant is one which has been referred erroneously to *D. stenoloba*.

Arabis demissa. Low and slender, the racemose stems or peduncles only 5 to 8 inches high, but the caudex large in comparison, stout and lignescent, not branched, or the branches not obvious, bearing a dense tuft of very narrowly oblanceolate glaucescent leaves, which are glabrous except for a few setose hairs on the margin at the base of the petiolar portion: peduncles several, with 2 or 3 subauriculate sessile bracts below the raceme, this (seen in fruit only) loose, the purplish and glaucous pods narrowly linear, 1 to 1¼ inches long, deflexed on very short pedicels: seeds in one row, suborbicular, not winged, though with more than the hint of a scarious margin on at least one side.

A few specimens of this interesting and strongly characterized new species were gathered from among the stones of a dry river bed near Cimarron, 4 June. They bear the number 16 of the collection, but are not in quantity for distribution in the sets.

Arabis stenoloba. Suffrutescent as to the branching caudex, the slender flowering stems less than a foot high, tufted basal leaves and those of sterile branches of the caudex oblanceolate, entire, less than an inch long, both faces hoary with a minute stellate tomentum: floriferous branches with scattered small leaves below the raceme, this short and few-flowered; sepals purplish, stellate-pubescent, as are also the pedicels and the stems, petals white, twice the length of the sepals: pods very narrowly linear, 1 to 1½ inches long, obtuse, glabrous, suberect on almost filiform pedicels of ¼ to ½ inch.

On stony hillsides above Cimarron, n. 21. Plant with much the habits and foliage of *A. eremophila*, but the pubescence different, the fruit more so.

Thelypodium Bakeri. Biennial, with several widely

divergent stems from amid the tuft of spreading basal leaves; herbage glabrous, except some hirsute hairiness at base of stem, and very glaucous: radical leaves petiolate, cauline numerous, narrowly cordate-ovate, sessile and clasping, entire, an inch long or more: flowers white, the greenish sepals somewhat spreading, the petals with broad claw and spreading spatulate-obovate limbs: spreading pedicels of the pod very slender, the pod itself narrow, not stipitate, an inch long or more.

Stony hillsides at Cimarron, 6 June, n. 32. This is a very near ally of Miss Eastwood's *T. aureum*, but its flowers are white, and the pods are not stipitate.

THELYPODIUM LILACINUM. Biennial, two or three feet high with rather many ascending branches from near the base, all racemose at the end; herbage deep-green and glabrous; basal leaves 2 or 3 inches long, spatulate-oblong, entire or repand, cauline reduced, lanceolate to nearly linear: flowers corymbosely crowded, but the raceme lengthened in fruit to 4 or 5 inches; sepals erect, rich lilac-purple, of less than half the length of the spatulate-linear petals, these at first white but soon changing to the lilac of the sepals: pods slender, torulose, $1\frac{1}{2}$ inches long, scarcely stipitate, slender-beaked.

At Doyle's, n. 635. Related to *T. integrifolium*, but of different habit, with different inflorescence, and peculiarly handsome flowers.

VIOLACEÆ.

Only the genus *Viola* is represented; but that in an interesting array of species by far the greater number of which are absolutely new.

V. CANADENSIS, Linn., n. 383.

V. RETROSCABRA, Greene, Pitt. iv. 290, very recently published, is represented by the two numbers 68, 144, both from near Cimarron. This and the three new ones next succeeding are of the natural group represented by the Old World *V. canina*.

V. STENANTHA. A multiciptal and cæspitose dwarf, forming mats 2 or 3 inches broad, little more than 1 inch high; herbage very minutely and sparingly scabro-puberulent, the angles of the petioles more obviously and retrorsely so: leaves deltoid-ovate to oval, little more than ¼ inch long, rather fleshy, lightly crenate, usually tapering, though abruptly, to the petiole: peduncles about equalling the leaves, bearing conspicuous subulate-linear bractlets near the flower, sepals large for the flower, oblong-linear, acute, glabrous, not scarious-margined: corolla dark-blue, about 5 lines long including the very long and narrow somewhat hooked spur, very narrow, the petals not widely expanding, the keel broad, the others narrow.

On the Grand Mesa, 23 June, n. 230. A species very well characterized by its long and narrow long-spurred dark-blue corolla.

V. DEMISSA. Scarcely larger than the last, but rhizomatous, the rootstocks chaffy with the persistent sere and brown stipules of a preceding year: leaves ¼ inch long, on petioles of about an inch, round-ovate to deltoid-ovate and oval, crenate, glabrous: peduncles much exceeding the leaves, bibracteolate towards the middle: sepals oblong-linear, acute; corolla nearly ½ inch long including the long obtuse cylindric spur, the petals subequal, widely expanding, violet above the middle, white below, and marked with purple veins.

In moist grassy depressions at 12,000 feet above Marshall

Pass, 19 July, n. 501. What is probably the same alpine or subalpine violet was collected by Mr. Baker at Cameron Pass in northern Colorado, as long ago as 1896. It is also represented in C. S. Sheldon's n. 277, obtained at Berthoud Pass in middle Colorado, 16 Aug., 1884.

V. INAMŒNA. Slender, glabrous, or the peduncles and petioles obscurely and retrosely hirtellous; stems several from the slender roots, but not much developed, often 1 or 2 inches long, greatly surpassed by the petioles and leaves, the plant thus appearing almost acaulescent: leaves round-ovate, obtuse, notably cucullate, lightly crenate; stipules subulate-linear, lacerately subpinnatifid: flowers seemingly always, even the earliest, short-pedunculate and apetalous, the small ovoid capsules deflexed.

In low meadows along the river at Gunnison, 25 July, n. 603. The species seems nearly related to *V. retroscabra*, though the leaves are not only glabrous but more rounded and cucullate, while in the apetalous character of the flowers, and in form of the fruit, it connects with *V. physalodes*. I also provisionally refer here a plant collected by Mr. Baker at Cameron Pass, northern Colorado, 15 July, 1896, though its leaves are less rounded and not cucullate.

The three species next succeeding are of the yellow-flowered group of caulescent violets.

V. GOMPHOPETALA. Allied to *V. Nuttallii*, the crown of the root-bearing few and very short depressed leafy and floriferous branches; the whole plant light-green, with ciliate leaves, and their veins pubescent: leaves from round-ovate in the earliest, to oval and oblong-oval or oval-lanceolate, the longest $1\frac{1}{2}$ inches long, somewhat repand-denticulate or subentire, marked underneath by fine light almost parallel veins or nerves, the petiole as long as the blade, slightly

winged above: peduncles 3 inches long, surpassing the leaves: sepals linear-lanceolate, acute, glabrous: corolla about ¾ inch wide, of rounded circumscription, the petals cuneate-obovate, very obtuse or almost truncate at the broad apex, all brown without, yellow within.

On open hillsides of the Grand Mesa, 23 June, n. 225.

V. PHYSALODES. Low, slender, the foliage very thin and the whole plant glabrous, sparsely leafy ascending stems well developed, 2 or 3 inches long, short-jointed and with a flower in each axil: leaves from subcordate-ovate to oval, obtuse, almost or quite entire, ¾ to 1¼ inches long, obviously veiny only beneath; pedicels barely an inch long in fruit, slender, deflexed: flowers minute, apparently always apetalous; pods also very short, subglobose or obovoid.

In thickets along the Cimarron River, 7 June, 1901, n. 67. The least showy, but by far the most interesting violet of all those which it has fallen to my lot to describe as new. The whole plant by its thin entire glabrous leaves, and numerous fruiting pedicels, always deflected beneath the leaves, give the species a singular likeness to some possible small *Physalis*. Though seeming to be altogether apetalous, I nevertheless see in it a member of that yellow-flowered group, of which *V. Nuttallii* is typical.

V. BITERNATA. Leafy stem not well developed at first, only 1 or 2 inches long, but subradical leaves very long-petioled, upright, 5 or 6 inches high, the peduncles of the few and early petaliferous flowers about as long: leaves very ample, palmately or sometimes subpinnately biternate, the primary divisions broadly cuneiform, deeply trifid and their segments coarsely and deeply tridentate, all the segments and teeth obtuse, the margins ciliolate and veins pubescent with short bristly appressed hairs: corolla ¾ inch broad, all the petals

obovate, obtuse, brown without, yellow within, the keel nearly twice the width of the others: small apetalous flowers many along the at length well developed stem, the capsules succeeding these large, round-obovid, on deflexed pedicels 1 or 2 inches long.

Related to *V. Sheltonii* of the far Northwest, but very different. The specimens, from two localities, collected in June, 1901, are numbered 42 and 233.

POLYGONACEÆ.

POLYGONUM MONTANUM. *P. Douglasii*, var. *latifolium*, Greene, Bull. Calif. Acad. i. 125. *P. Douglasii*, var. *montanum*, Small, Polyg. 118. Low, fastigiately branched from the base, 3 to 6 inches high, the banches floriferous from the base, but the flowers few among the proper leaves, most of them forming a mere bracted spike beyond the foliage, all the angles of stem and branches denticulate-scaberulous, and other parts also more or less scabro-puberulent: leaves oblong-lanceolate, very acute, often an inch long, 1-nerved, the nerve sharply carinate beneath the leaf: fruiting perianth subsessile but nodding, its segments dark green or purplish except marginally and completely enclosing the achene, this black, smooth and shining, the faces obtusely rhomboidal, the cross-section 3-lobed rather than triangular.

The above description is drawn from a series of specimens collected by Mr. Baker this year at Marshall Pass, 20 Aug., and to be distributed under n. 893. These specimens represent perfectly what I had in mind when naming *P. Douglasii*, var. *latifolium*. But in the lapse of sixteen years, other things have become confused with this in my own and other herbaria, some of which are now to be segregated. Habitally, as well as in its general dimensions, *P. montanum* much more nearly approaches *P. Austinæ* than *P. Douglasii*;

and in this, as well as in a few but very constant characters it may well claim specific rank.

P. COMMIXTUM. Near the last but dwarf, 2 or 3 inches high, more herbaceous and with even ampler and more copious leafiness, the bracted spikes very short and dense; leaves and stem glabrous, the former from oval and even rhombic-ovate to oblong, mostly obtuse but with an abrupt sharp point, the midvein conspicuous, some secondary veins more or less obvious as diverging from it: perianths green, their segments with white or purplish margins, more widely expanding in flower and more loosely investing the longer and partly protruding achene, this more elongated than in the last in proportion to its thickness, dark and shining.

The only specimens known to me of this are of Mr. Baker's collecting as long ago as 1896 in northern Colorado. One sheet is from Grizzly Creek, 24 Aug., the other from Cameron Pass, 10,000 feet alt., 13 Aug., both called by him *P. Douglassii latifolium.* The most notable characteristic is the narrow and partly exserted achene. This, with the dwarf stature, broad venulose leaves, and the excessive leafiness, seem to mark it as a good subspecies.[1]

[1]A study of the above Bakerian plants has lead to the detection of another new species nearly allied, namely:

P. HOWELLII. Sparingly branched from the base, but the few branches quite erect and contiguous, almost equably leafy to the summit and sparsely floriferous throughout, more scabrellous than *P. montanum* on all the angles; herbage of a paler and rather yellowish green: elliptic-oblong leaves very acute, thinnish and not inclined to be revolute, their thin margins serrulate-scabrous: ocreæ more scarious and almost fimbriate: perianths few, erect both before and after flowering, though not sessile: achenes wholly included and closely invested, very black and highly polished, the face rhombic-ovate, i. e., broadest, and rather abruptly so, much below the middle.— Known to me only from Mr. Howells' specimens taken in the Siskiyou Mountains, northern California, 8 July, 1887, and distributed for *P. Douglasii latifolium.*

RUMEX BAKERI. A yard high, the stems solitary or several, from a deep-seated taproot parted below into coarse fleshy-fibrous branches and with some more slender ones radiating around the crown of the main root: leaves, thin, glabrous, the basal ones with lanceolate-cordate blade 8 or 10 inches long on a petiole nearly as long, the cauline lance-linear, short-petiolate, those of the long and rather narrow panicle linear-acuminate, subsessile, 3 or 4 inches long, deflexed: fruit small (barely two lines wide), deltoid-suborbicular, very obtuse, grainless, delicately (but under a lens very distinctly) pinnate-veined, the veins running into a distinct favose reticulation toward the margin, but the margin itself thin, nerveless, either entire or obscurely somewhat crenate.

Common in wet meadows about Gunnison, 22 August, n. 903, seeming related to *R. polyrhizus* of the more northerly mountains.

ERIOGONUM CHLORANTHUM. Near *E. flavum*, but more widely cespitose, the many branches of the caudex relatively much more elongated and densely invested throughout with the remains of the foliage of former years; leaves much thinner, spatulate-oblong, obtuse, hoary-tomentose beneath, glabrate above, nearly $1\frac{1}{2}$ inches long: scapiform peduncles both slender and short, little surpassing the leaves, or even scarcely equalling them: involucres solitary, many-flowered, the flowers rather large, the cluster almost $\frac{3}{4}$ inch broad: perianths greenish-yellow, the segments equal, the tube villous, acute at base but not stipitate.

On stony alpine slopes of Mt. Ouray, forming large mats, 20 August, n. 853.

ERIOGONUM BAKERI. Allied to *E. flavum*, rather taller,

the branches of the caudex very slender and only loosely leafy, the leaves thin, the elliptic-lanceolate blades ½ to 1 inch long, on slender petioles much longer, white-tomentose beneath, sparsely villous above: scapiform peduncles 5 to 8 inches high, erect, slender; inflorescence of a sessile involucre and 1 to 3 dichotomous peduncles from its base, the whole number of involucres thus 7 to 9, all turbinate: perianths yellow, small, very long-stipitate, silky villous, the inner segments much longer than the outer, all obovate, obtuse.

Black Cañon, 1 Aug., n. 696. Said to be cespitose in rather small tufts. The inflorescence is like that of *E. Jamesii*, though far less ample; and the real affinity is with *E. flavum*.

Eriogonum salicinum. Allied to *E. microthecum* and *E. Simpsonii*, the tufted woody stems and long corymbose panicled peduncles together more than a foot high: blade of leaf lanceolate or oblong-lanceolate, about 1½ inches long, the petiole little more than ½ inch, stem and lower face of leaves white-tomentose, surface glabrate: the long peduncles perfectly glabrous and very glaucous: corymbose panicles loose, diffuse, 8 to 10 inches broad: involucres very numerous, small and few-flowered, broadly turbinate or subcampanulate, 5-toothed, the teeth erect, woolly within: perianths less than a line long, segments oblong, obtuse, white.

Habitat of the last; n. 375. The species would not easily be distinguished from *E. Simpsonii* but by its broad and short thin leaves.

Asclepiadaceæ and Apocynaceæ.

Ascepias speciosa, Torr. Grand Junction, 11 June, n. 251.

ASCLEPIAS HALLII, Gray. Excellent specimens of a plant that is rare; obtained at Gunnison, 25 July, n. 595.

APOCYNUM AMBIGENS. Intermediate between *A. androsæmifolium* of the East and *A. pumilum* of the Pacific slope; smaller than the former, more erect and more copiously floriferous, the corollas larger but still campanulate; follicles much shorter and thicker.

In the Black Cañon, 20 June, n. 202; also at Rogers', 14 Aug., n. 799. The plant is frequent in several parts of Colorado, and has passed for *A. androsæmifolium*; but both this and *A. pumilum* are better accepted as fair geographical subspecies.

APOCYNUM CANNABINUM, Linn. In moist ground on Deer Run, 10 June, n. 80.

APOCYNUM LIVIDUM. Several feet high, with the pale and glaucescent hue of *A. cannabinum*, but the oblong-ovate mucronate leaves much larger and more spreading: inflorescence consisting, as in that species, of terminal and naked cymes, but flowers few, large and nodding, of a pale flesh-color; sepals thin and whitish, triangular-lanceolate, erect, half as long as the corolla, this campanulate, rather deeply cleft and with spreading or recurved segments.

Common on railway embankments in Black Cañon, 8 July. The plant recalls the Californian *A. floribundum*, but differs in having few and large flowers rather than almost innumerable small ones.

ASPERIFOLIÆ.

MERTENSIA CONGESTA. Tufted stems a foot high or less, stout and rather succulent, ascending; whole herbage of a

light and rather vivid green and, to the unaided eye seeming glabrous: leaves many and ample, from elongated-ovate to broadly oblong, obtuse, or some even retuse, the cauline sessile, the radical short-petioled, all 2 to 3 inches long, minutely and sparsely strigose above, glabrous beneath: flowers many, mostly in a single condensed terminal cluster, those of the few subterminal branches similarly crowded, the pedicels very short: calyx deeply cleft into ovate acute or broadly lanceolate segments, these strongly hirsute-ciliate and, in maturity, traversed by a very prominent light-colored midvein: corolla deep-blue, about 4 lines long, the cylindric tube and campanulate limb about equal: nutlets acutely ovate, brown when mature and indistinctly sinuate-rugulose.

On Poverty Ridge, near Cimarron, 13 June, in open parks, n. 129; also at Cerro Summit, a smaller plant, n. 62.

Mertensia lateriflora. Stems tufted, rather strict and very leafy, a foot high or more, the whole plant canescently silky-strigulose: leaves almost crowded on the stem from base to summit, oblong-linear, acutish, about 3 inches long: short cymose flower-clusters in all the axils from near the middle of the stem, on pedicels of about an inch long, the lower not equalling, the uppermost little surpassing the leaves: calyx small, completely divided into short-lanceolate scarcely acute segments, these strongly appressed-villous and ciliate: corolla of a light-blue, small, hardly 4 lines long, the limb only distinctly shorter than the tube.

Said to be common at 9,000 feet, above Carson, where it forms large clusters, in flower 2 July, n. 334. Species certainly resembling *M. linearis*, but a much larger plant than that, and with smaller flowers, the pubescence, however, being totally different. The inflorescence is peculiarly long, narrow and secund.

MERTENSIA CYNOGLOSSOIDES. Stems depressed, 1½ feet long, sparsely and very amply leafy, the herbage delicate in texture and of a vivid green: lowest leaves oblong, obtuse, 4 or 5 inches long, on slender petioles of equal length, the cauline ovate-lanceolate, acutish, sessile by a subcordate-clasping base, these also 3 or 4 inches long and spreading, all very thin, glabrous beneath, sparsely but strongly scabrous above and scabrous-ciliolate: racemes few and sparse, long-peduncled, the upper part of the peduncle and the pedicels sparsely setose-hispid: sepals small, lanceolate and ovate-lanceolate, obtusish, hispid-ciliolate, otherwise glabrous: corolla light-blue, almost funnelform, the short and rather broad tube quite exceeded in length by the campanulate limb into which it gradually passes: nutlets white (perhaps immature), ovate, incurved at summit, turgidly and very irregularly rugose.

On moist ledges in the Black Cañon, 20 June, n. 191. A remarkably distinct species.

MERTENSIA MURICULATA. Of the size of the last, nearly, and like it almost prostrate, but of firm texture and glaucescent: lowest leaves elliptical, the blade 3 or 4 inches long, the petiole shorter; cauline ovate and lance-ovate, 1½ to 2½ inches long, sessile and partly clasping, all finely dotted above with white pustules developing centrally a low, stout white scabrous point, the margin scabrous-ciliolate with short pustulate hairs: flower-clusters in all the leaf-axils, long-peduncled, somewhat crowded, not obviously racemose: sepals very short, deltoid-ovate to shortly triangular-lanceolate, obtuse, setulose on the back and strongly hispid-ciliate: corolla short and funnelform: nutlets ovate, straight and erect, lightly rugulose and minutely tuberculate.

Habitat of the last, and manifestly allied to it, though its firm texture, peculiar pustulate roughness, as well as the

differences in inflorescence, calyx and achene, preclude the confusing of them. It is Mr. Bakers' n. 193.[1]

Oreocarya horridula. Low multicipitous perennial, the not stout rather loosely leafy and floriferous stems 4 to 7 inches high, the whole plant strongly setose-hispid: obovate obtuse upper end of the leaf tapering spatulately to a rather long and narrow petiolar base: racemose short branches of the loose and short inflorescence linear-bracted, but the bracts barely equalling the calyx; this in fruit ½ inch long, its linear and narrow segments covered with hispid hairs; corolla white, rather more than ½ inch long, with narrow tube and small spreading limb: nutlets (only one, usually) narrowly ovate, erect and straight, sharply

[1] The characters of two northwestern Mertensias may here be given:

M. symphytoides. Stout, erect, barely a foot high, leafy to the summit and even throughout the broad cymose-panicled inflorescence with large elliptic-lanceolate acute leaves, these of a bright green and appearing glabrous, but sparsely somewhat tuberculate-scabrous, especially on the margin and the lower face: leafy cyme rather lax; calyx rather small, deeply cleft, the segments ovate-trigonous, acute, glabrous except as to the margin, this very shortly and almost obscurely scabrous-serrulate: corolla ½ inch long, quite tubular, the upper portion quite cylindric and little shorter than the proper tube: nutlets rather coarsely low-tuberculate.—Known to me only from Emigrant Springs, in the lava beds of Modoc Co., California, where it was collected by Mrs. R. M. Austin, 20 June, 1894.

M. stenoloba. Size of the preceding, quite as leafy, but the leaves oblong-lanceolate, acute, thin and quite glaucous, sparsely scabrous, most so marginally: inflorescence as in most species: calyx parted into narrowly lanceolate-acuminate long segments, their margins sparsely setose ciliolate: full grown nutlets scarcely half as long as the calyx and sinuate-rugose.—Based Mr. Flodman's n. 752 from the Bridger Mountains, Montana (as to the specimens in my set), and named by Mr. Rydberg "*M. lanceolata*, DC." But it can have no intimate connection with Pursh's type on which the species was founded; for that has a "short calyx," while here that organ is rather extremely elongated.

margined, the oack showing a few irregular rugæ and some interspersed tuberculation.

Deer Run, 11 June, on a dry bank; n. 133.

OREOCARYA NITIDA. Multicipitous, slightly woody at base, the stoutish stems a foot high, copiously leafy at base, the leaves 2 to 4 inches long, oblanceolate, acute, tapering to a long petiolar basal portion, this again dilated at the insertion, both faces equally silvery-silky or satiny, without other pubescence: flowers copious, in a loose open thyrsus of close racemes: calyx in fruit ½ inch long, the segments narrowly linear except at the broad base, clothed throughout with a dense white villous tomentum and some interspersed setose-hispid hairs; corolla ½ inch long or more, with very narrow tube abruptly widening to form a short throat, the proper limb three lines broad, the color of the whole apparently white: nutlets (mostly solitary) large, ovate, straight and erect, dark-brownish, closely covered with a minute whitish almost muricate tuberculation.

In dry stony ground at Deer Run, 11 June, n. 95. A species noteworthy by the whiteness and softness of its almost satiny indument.

Other Asperifoliæ of the collection are *Cryptanthe Fendleri*, Greene, n. 780; *C. crassisepala*, Greene, n. 75; *Allocarya scopulorum*, Greene, nn. 152, 938; *Lappula occidentalis*, Greene, n. 327; *L. ursina*, Greene, n. 471, the species a rare one, but the specimens too young; *Lithospermum Torreyi*, Nutt., or possibly a new species closely allied to it, n. 127; *Oreocarya multicaulis*, Greene, n. 455; *Eritrichium aretioides*, Rydb., n. 845; *Mertensia ciliata*, Don, nn. 189, 403, 486; *M. pratensis*, Heller, nn. 391, 773; *M. Bakeri*, Greene, nn. 293, 497.

Labiatæ.

Family not strongly represented in the region, only the following having been collected: *Salvia lanceolata*, Willd., n. 679; *Scutellaria galericulata*, Linn., nn. 465, 552, 815; *Mentha Canadensis*, Linn., n. 547; *Dracocephalum parviflorum*, Nutt., n. 599; *Agastache urticæfolia*, Rydb., n. 414; *Stachys scopulorum*, Greene, n. 359.

Monardella parvifolia. Suffrutescent at base, the many slender tufted stems a foot long more or less, decumbent at base, or more depressed, subcinereous-puberulent: leaves mostly ovate-lanceolate, some oblong-lanceolate, all entire, obtusish, nerveless except as to the quite distinct midvein, obscurely puberulent, closely glandular-punctate, small, half as long as the internodes, the largest seldom $\frac{1}{2}$ inch long including the short petiole: heads about $\frac{3}{4}$ inch broad; bracts scarcely colored, somewhat strigosely pubescent along the veins and densely white-ciliate all around the margin: nerves of the calyx strigose-hairy, the short teeth densely but shortly setose-hirsute: corollas lilac-purple.

Frequent in the cañon of the Gunnison near Cimarron, where it was first collected by myself in 1896, and now again by Mr. Baker, n. 678. The species may probably include the so-called *M. odoratissima* of southern Utah.

Scrophulariaceæ.

Castilleia cognata. Near *C. linariæfolia*, as tall and as nearly glabrous, but in habit strict, the leaves both shorter and suberect rather than spreading; flowers only half as long as in that species, and crowded, forming a spike both narrow and dense: floral bracts less deeply trifid and their segments very unequal, the middle one much the longest, oblong, obtuse, the others both short and narrow, the whole

bract villous: calyx deeply cleft anteriorly; galea of the corolla shorter than the tube.

Border of a meadow, at Jack's Cabin, 7 July, n. 616. The collector notes that he saw but one plant, but does not mention the occurrence of other species of the genus in that vicinity. That the bracts and calyx are cream-colored, instead of crimson, is one of several hints given in the aspect of the plant, of a possibly hybrid parentage between *C. linariæfolia* and *C. septentrionalis.*

Pentstemon teucrioides. Suffrutescent, low, the slender tufted stems erect, 2 to 5 inches high, leafy throughout and floriferous from below the middle, the whole herbage cinereous-pubescent: leaves spatulate-linear, entire, almost pungently acute, less than ½ inch long, usually exceeding the internodes: flowers 5 or more in each subcapitate and short-pedicelled glomerule, all forming as it were a secund raceme along the upper one-half and more of the stem: segments of the calyx subulate-lanceolate, acute, entire, wholly herbaceous: narrow and strongly bilabiate deep-purple corolla about ¾ inch long, glabrous; sterile filament bearded almost from the base with orange-yellow hairs; anthers glabrous.

Collected at Sapinero, 19 June; said to be common there, on dry ground, n. 186. The specimens are not well in flower; and the aspect of the plant, particularly as to its inflorescence, is singularly like that of a *Teucrium.*

Pentstemon procumbens. Suffrutescent, low and rather slender, the older and more woody parts of the branches prostrate and rooting, the leafy and floriferous parts assurgent, the whole 6 to 10 inches long; branchlets retrorsely puberulent, as also the pedicels and calyx, but leaves green

and almost glabrous, these many, only ½ inch long but rather exceeding the internodes, spatulate-obovate, obtuse or some of the earliest obcordate-notched, entire, those below the inflorescence with some fascicled smaller ones in their axils, the upper with 1 to 3 flowers in their axils: calyx parted deeply into linear-liguliform abruptly acutish and minutely ciliolate lobes: corolla elongated and narrow; anthers glabrous.

Forming large mats on open slopes at Keblar Pass, 7 Aug., n. 733. The species is related to *P. cæspitosus*. It may possibly be identical with Gray's so-called var. *suffruticosus* of that species; but of that I have seen no specimens, and the description is insufficient for the identification of a species.

Compositæ.

Senecio contristatus. Stems several, stout, erect, 2 feet high or less, leafy up to the simple raceme of several large nodding rayless heads: lowest leaves with an elliptic blade 3 inches long and a broadly winged petiole half as long, the cauline more lanceolate, subsessile or sessile, all closely callous-denticulate, scaberulous between the callosities, otherwise glabrous, like all other parts of the plant: heads broadly campanulate, ¾ inch high, the lanceolate acute bracts of the involucre of a very dark red-brown, the inner ones with obvious yellow scarious margin: rays none, disk light-yellow.

In small clumps on open ground at Keblar Pass, 14 Aug., n. 787. An interesting addition to that small group of Rocky Mountain species marked with few and large rayless heads. This one is, however, more nearly allied to the southern *S. Rusbyi* than to its near neighbor, *S. scopulinus*.

Senecio pyrrhochrous. Erect, stoutish, 2 feet high,

glabrous, rather copiously leafy toward the base, remotely bracted above the middle: lower leaves oval, obtuse, coarsely but rather lightly crenate, 2 or 3 inches long, on slender petioles of 4 or 5 inches, the middle cauline lyrate-pinnatifid and the bracts above them similar but reduced and sessile: terminal cymose corymb like that of *S. aureus*, but the heads larger, the campanulate involucres 4 or 5 lines high: flowers of both disk and ray fiery-red.

Common in meadows at Jack's Cabin, 25 July, n. 612. A very handsome subspecies of *S. aureus*, with large leaves very regularly crenate all around the margin; the flowers of the richest fire-red. Mr. Baker's n. 348 from meadows near Sargent, not yet in full flower at date of July 5, must also be referred here, though in some of these specimens the lowest leaves are subcordate, and many of them almost entire.

Senecio lapathifolius. Stems clustered, stout, more or less decumbent, a foot high or more, leafy throughout, the herbage deep-green and glabrous: leaves 4 to 6 inches long, lanceolate, acute, sessile by a broad, or sometimes tapering half-clasping base, undulate, more or less obviously denticulate: heads 5 to 10, large, the campanulate involucres more than ½ inch high, mostly arising singly from the axils of the leaves, these on very long peduncles, the whole forming a loose subcorymbose panicle; bracts of involucre lanceolate (rather broadly and triangularly so): rays narrow, about as long as the bracts: achenes striate, glabrous.

On the divide between Ouray and Telluride, 10 Aug., n. 738. In some ways suggestive of *S. crassulus*, and doubtless allied to it, but in character very different. The long peduncles are peculiarly turbinate-thickened under the involucre, and the whole plant appears to be much more succulent than *S. crassulus*.

Senecio pentodontus. Dwarf, multicipitous, the scapiform peduncles 3 to 5 inches high, the tufted and upright leaves scarcely half as high, these subcoriaceous, their obovate-spatulate obtuse mostly 5-toothed (often 3-toothed, or even quite entire) blades commonly about as long as the petioles; growing parts of the plant hoary-tomentulose, the older foliage glabrate: peduncles with one or more narrow bracts and bearing mostly 3 slender-pedicelled heads; involucres subcylindric, nearly ½ inch high, their bracts thin, narrowly lanceolate: rays few, yellow, oblong, shorter than the involucral bracts.

On open knolls below the limit of trees, near Carson, 2 July, n. 309. An interesting subalpine *Senecio* which may be regarded as in a manner intermediate between two such different species as *S. petrocallis* and *S. werneriæfolius.*

The other Senecios of the sets are the following: *S. admirabilis*, Greene, 732, 875, both fine specimens; *S. amplectens*, Gray, 719, 771, also beautifully illustrating this species; *S. atratus*, Greene, ? 756, the foliage too thin and too faintly dentate, perhaps almost as near *S. milleflorus*; *S. blitoides*, Greene, 341, 755; *S. carthamoides*, Greene, 731, 851, both numbers excellent; *S. chloranthus*, Greene, 523, not exactly typical; *S. crassulus*, Gray, 774; *S. eremophilus*, Rich, 596, 748; *S. Fendleri*, Gray, 516, an unusual state with no pinnatifid leaves, 857, quite nearly typical; *S. flavulus*, Greene, 114, 176; *S. Holmii*, Greene, 729; *S. integerrimus*, Nutt., 44; *S. lactucinus*, Greene, 772; *S. milleflorus*, Greene, 525; *S. mutabilis*, Greene, 19, 33, 180. *S. petrocallis*, Greene, 770; *S. pudicus*, Greene, 683, 858; *S. spartiodes*, Torr. & Gray, 446.

Arnica lanulosa. Gregarious by horizontal root-stocks, the many stems rather low, 5 to 10 inches high, stoutish,

very leafy, all the leaves, even the upper cauline, greatly exceeding their internodes, all lanceolate, entire, the longest 3 or 4 inches long including the short petiole, villous-lanate on both faces but most so beneath and there notably parallel-veined, also minutely viscid-glandular beneath the indument, the stem more woolly: heads 3 to 5, short-peduncled, bracts of campanulate involucre biserial, lanceolate, obtusish, appressed-silky but sparsely so: rays small, deep-yellow: disk-corallas with very long densely villous and sessile-glandular tube and very short narrow limb: achenes hirtellous and also minutely glandular; pappus long, very fine, merely scabrous, dull-white.

On shelving banks of Crested Butte, n. 336, and at Marshall Pass, n. 881. Related to *A. incana* and *A. Bernardina*, especially the last, but stout and low, the leaves quite entire, the disk-corollas and the pappus both characteristic.

Arnica silvatica. Stoutish, a foot high or more, with 4 or 5 pairs of leaves mostly large and surpassing the internodes, the stem loosely pubescent, the leaves very sparsely clothed with short appressed hairs and clammy with copious minute sessile glands: radical leaves none, lowest pair round-obovate and small, the pair next succeeding very large, obovate, the upper pairs lance-ovate, all more or less connate-sheathing and coarsely dentate: peduncles 3 to 5, terminal and axillary: involucres campanulate, nearly $\frac{3}{4}$ inch high, the narrow bracts thin, somewhat villous and decidedly viscid: rays large, deep-yellow; disk-corollas with short soft-villous tube and longer funnelform limb: achenes sparsely villous-hirsute, in no degree glandular; pappus light-tawny.

In woods of spruce at Ruby, 8 July, n. 715. A plant with much the general aspect of *A. latifolia*, though lower

and stouter, but quite distinct by characters of pubescence, flower and fruit.

ARNICA PARVIFOLIA. Stems usually 3 or 4 from the end of the rhizome, mostly 8 or 10 inches high and monocephalous, each with about 3 pairs of small leaves, the petioles of these and also the stem and peduncles loosely villous and somewhat viscid: lowest leaves subcordate-ovate, remotely and often repandly dentate, the cauline with rhombic-lanceolate acute blade 1 to 1½ inches long, the lower ones petiolate, the upper sessile: involucre narrow-campanulate, more than ½ inch high, its lanceolate bracts viscid-pubescent: rays large, golden-yellow, deeply tridendate: slender achenes with short scattered bristly hairs and many minute dots; pappus clear white.

Marshall Pass, at 10,000 ft., 19 July, n. 515. Related to *A. cordifolia*, much like it as to flower and fruit, but of different habit and foliage.

HELIANTHUS FASCICULARIS. Perennial, rather slender, the solitary stem 2 or 3 feet high from a fascicle of small fusiform tuberous roots, glabrous or sparsely pubescent, glaucescent: leaves opposite, narrowly and acuminately lanceolate, remotely and lightly serrate, triple-nerved below the middle, scabrous on both faces with short pustulate acute hairs, 3 to 6 inches long, on petioles of an inch or less: heads 1 to 3, the broadly campanulate involucre of lanceolate and subulate mostly appressed bracts strigose-pubescent and ciliate: achenes oblong, glabrous, about 2½ lines long, the ovate-acuminate lacerate-toothed paleæ more than half as long.

So far as known first collected by myself at Cimarron, Colorado, 3 Aug., 1896; but it is now in Mr. Baker's collection

from Gunnison, n. 816. The propagation is by a few runners from the crown of the fascicled roots.

TETRANEURIS INTERMEDIA. Perennial, cæspitose, the slender peduncles 6 to 8 inches high, rarely bractless, usually with one or more leafy bracts below the middle, not rarely parted below the middle into two branches each monocephalous: leaves comparatively short, narrowly spatulate-linear and linear, green and glabrate or with a few scattered very long pilose hairs on the lower face or near the margin, rather notably punctate: peduncles more or less villous, canescently so under the involucre, this small, its oblong acutish bracts villous-lanate: paleæ of the pappus ovate oblong, conspicuously awned.

Dry hills at Cimarron, southern Colorado, 6 June, 1901, C. F. Baker, n. 34. Intermediate between the acaulescent and caulescent species of the genus.

PSILOSTROPHE BAKERI. Herbaceous, apparently perennial, much branched, 4 to 8 inches high, the branches at earliest flowering not much exceeding the large spatulate-obovate or -oblong green but thinly villous-lanate large basal leaves, these obtuse, entire, some of the cauline coarsely toothed or 3-lobed at or near the apex, all obviously 1 to 3-nerved: branches short, almost divaricate, the breadth of the plant greater than its height: heads scattered, very large, apparently always 5-rayed and the rays more than ½ inch long, deeply 3-lobed: bracts of involucre green-herbaceous, obviously distinct, their tips spreading: achenes glabrous, closely and strongly striate; paleæ of the pappus oval, obtuse, more or less toothed across the summit, little longer than broad, not half as long as the achene, nor a third as long as the corolla.

Near Montrose, southwestern Colorado, 4 June, and near Grand Junction, 11 June, 1901, C. F. Baker, nn. 14 and 106. Species strongly marked both in habit and characters of fruit.

Hymenopappus ochroleucus. Perennial, the stoutish caudex branching, each branch with a tuft of petiolate leaves and a subscapiform though branched and corymbose stem 12 to 18 inches high; herbage white-floccose when very young, the stem and fully developed foliage more or less completely glabrate: principal leaves 4 or 5 inches long, pinnate or more or less completely bipinnate, *i. e.*, some of the segments entire, only those below the middle of the rachis parted into one or more segments, all linear: loosely subcorymbose heads 12 to 20, broadly turbinate, ½ inch high: corollas whitish or cream-color: paleæ of the pappus rather many and narrow, little exceeding the silky-villous indument of the achene, and of hardly half the length of the corolla-tube.

Dry hillsides about Cimarron, Colorado, June, 1901, C. F. Baker, nn. 25 and 269.

Hymenopappus parvulus. Tufted stems many on a branching perennial caudex, leafy at base only, rather slender, 5 to 9 inches high, bearing a few subcorymbose small heads at summit: leaves canescently tomentose, once or twice pinnately parted into linear segments: turbinate heads only 3 or 3½ lines high; bracts of involucre oblong-obovate, mainly green and tomentulose but with light-green subscarious margin: corollas greenish-yellow: achenes with short-villous and spreading pubescence; paleæ of pappus 7 to 9, cuneate-obcordate, longer than the corolla-tube, the midvein prominent below, the organ otherwise thin-hyaline.

On dry stony ground in the lowlands about Gunnison, nn. 449 and 840.

ARTEMISIA BAKERI. Allied to *A. Mexicana* but more slender, and with the tufted stems decumbent or depressed and also rather loosely branching: foliage rather sparse, green and glabrous above, white-tomentose beneath, the lower leaves with few and rather remote pinnate segments, those of the branchlets entire, all linear or with linear segments, the margins narrowly revolute: heads in an ample and loose panicle, many of them short-pedicellate, campanulate, the outer bracts short, herbaceous, acute, the inner obtuse and largely scarious, all somewhat arachnoid-canescent.

This species, very well marked as to habit, was first collected by myself, in the cañon of the Gunnison, near Cimarron, Colorado, in August of 1896. Mr. Baker now distributes it, and from the original station, or near it, under n. 698.

ERIGERON SIMULANS. Near *E. pumilus* and of the same size and habit, the many short stems crowning the taproot almost or altogether herbaceous; the spatulate-linear leaves strongly and very stiffly hispid-ciliate from the base to the middle, the upper portion (or proper blade) with a finer strigose hairiness closely appressed: pedunculiform monocephalous branches sparingly leafy below, slender and naked under the involucre, this green and as if glabrous to the unaided eye, but its outermost bracts sparsely bristly-hairy: rays pale flesh-color or white: outer pappus very conspicuous, of oblong-obovate acutish laciniate-toothed paleæ.

Stony hills about Cimarron, southern Colorado, 6 June,

1901, C. F. Baker, n. 40. The plant so closely simulates, habitally, the common but always more northerly *E. pumilus*, that but for its very remarkable double pappus it would have been let pass for that species. But upon examination its pubescence is of another character, and the whole plant is greener and more slender.

Plantaginaceæ.

Plantago retrorsa. Perennial, of the size and with the habit of *P. eriopoda*, and with even a closely similar pubescence, but wholly wanting the fuscous woolliness, which so conspicuously marks that species, the leaves not entire but coarsely though sparsely runcinate-toothed below the middle: sepals much more herbaceous, and capsules more elongated; seeds elliptic-oblong.

Abundant in alkaline meadows at Doyle's, 28 June, n. 627. Excellently marked by the four characters indicated, as distinct from the kindred species, with which it may have been confounded, if before collected; but the plant is wholly new to me.[1]

Nyctaginaceæ.

Abronia Bakeri. Allied to *A. fragrans*, but much smaller, and suffrutescent, the stems and branches, both the woody

[1] P. Shastensis. Also allied to *P. eriopoda*, and with definite traces of its basal woolliness, but leaf-outline and leaf-texture very different, all being comparatively thin, not at all ceriaceous, and the outline distinctly obovate, the whole margin apt to be more or less repand-toothed: spikes relatively short, and much more dense than in *P. eriopoda*; capsules almost globose and not exceeding but even quite included within the calyx, the sepals of which are largely herbaceous, and their narrow scarious margins distinctly ciliolate all around: seeds oval.—Species known to me only as collected by myself on the plains of Shasta River in Northern California, twenty-five years since. They were distributed for *P. eriopoda*, but are now seen to represent something very distinct.

and the herbaceous ones, glabrous and very glaucous: leaves much smaller than in *A. fragrans*, subcordate-orbicular to oval, very obtuse, usually about an inch long, on petioles somewhat longer or shorter: flower smaller than in *A. fragrans*, the perianth-limb apparently funnelfrom rather than rotate: fruits scabrous on the sides, roughish-tomentulose at summit.

This species, easily distinguished from the northern and and true *A. fragrans* (a large perennial, wholly herbaceous) by its small size, suffrutescent habit, white stems and total lack of clamminess, is well represented in the following numbers: 13, obtained at Montrose, best showing the half-shrubby growth; 89, from Deer Run, somewhat larger, and 92, from Grand Junction; this last, at least in my set, is a young plant, flowering perhaps the first year from the seed, and thus exhibiting, naturally, no sign of the ultimate woodiness of the stem.

ALLIONIA ROTUNDIFOLIA. About a foot high, the stoutish clustered stems ascending, densely crinite-hirsute as to the lower and shorter internodes, the upper portions, as well as the lower face of the uppermost leaves more loosely and hispidly hirsute: lowest leaves suborbicular, obtuse, about 1½ inches long, the upper larger, sometimes round-ovate, all more or less woolly-ciliolate: flowers and fruits not seen.

Obtained at Swallow's, between Pueblo and Cañon City, 1 June, n. 3. The specimens, though not yet in flower, exhibit in their peculiar foliage and pubescence characters sufficient for the establishment of a species. The inflorescences are clustered, and arise from the axils of only the uppermost leaves.

PAPILIONACEÆ.

THERMOPSIS PINETORUM. Less than a foot high at flowering, in age rather taller; oblong and obovate-oblong leaflets

1½ to 2 inches long, obtusish, sparsely appressed-hairy beneath, glabrous above; stipules ovate, 1 to 1½ inches long: racemes short and few-flowered, even subcapitate, the corollas large; calyx villous, its triangular teeth half as long as the tube: pods about 3 inches long, ascending, straight, appressed-pubescent.

At Marshall Pass, common in open places among the pine woods, 19 July, n. 485; flowering specimens only; but the fruiting specimens, from precisely the same locality, were obtained by myself, 4 Sept., 1896, and have been kept ever since, under the above name as a new species, awaiting flowering specimens.

THERMOPSIS STRICTA. Much taller, even 1½ feet high in flower, very strict, and with a long interrupted raceme of smallish flowers of which the lowest are subverticillate: mature leaflets 1¾ to 2½ inches long, mostly oblong or elliptical, some of the largest inclining to oblanceolate, glabrous above, sparsely pubescent beneath; ovate stipules 1 to 2 inches long: calyx canescently villous, its teeth narrower, more than half the length of the tube: pods very erect, 2 inches long or more, villous-tomentose.

In meadows at Sapinero, 19 June, n. 173, in flower; also at Gunnison, 25 July, n. 604, in fruit.[1]

[1] T. ANGUSTATA. Two feet high and somewhat bushy by several well developed leafy sterile branches, but only the main stem bearing flowers: leaflets about 2 inches long, elliptical, deep-green, villous-pubescent beneath (as also the stem), but glabrous above; stipules small and narrow, barely 1 inch long, or even less, and lanceolate: calyx and pods hoary-tomentose, the latter about 2 inches long, strictly erect.—Known only as collected by myself, at Star Valley, in the foothills of the Ruby Mountains, Nevada, 20 July, 1896. The specimens are in fruit only, but by the remarkably narrow, and almost exactly elliptical foliage, and the tomentose pods, a marked species is indicated.

LUPINUS RUBRICAULIS. Perennial, the tufted stems slender, a foot high or more, simple, remotely leafy with rather small very slender-petioled leaves, both stem, petioles and, in part the leaves dark red-purple and sparingly and minutely silky-villous: leaflets about 7 or 8, cuneate-oblong or elliptical, unequal, the largest 1½ inches long, the slender petioles much longer; stipules small, subulate: raceme sessile, 3 or 4 inches long, rather dense, the flowers scattered, middle-sized, pedicels and very gibbous calyx white-silky; corolla dark blue-purple, banner shortest of all the petals, the narrowly pointed falcate keel longest and naked: fruit not seen.

On moist slopes of Crested Butte, 6 July, n. 342; conspicuous by the dark purplish hue of the herbage, and in habit quite an elegant species.

LUPINUS ARCEUTHINUS. Stems rather rigidly erect, forming large tufts 3 feet high, simple and very leafy, hoary-pubescent throughout, the stem with a villous, the leaves with a more short and appressed silky-velvety indument: leaflets 7 or 8, lance-elliptical, acute, the largest 2 inches long; raceme sessile, 6 inches long, rather dense, all the flowers scattered, rather large; stout pedicels, and short gibbous calyx scarcely more velvety than the rachis; corolla wholly dark blue-purple, the petals subequal, the not strongly falcate keel densely woolly-ciliate throughout: pods more than an inch long, quite broad, velvety-tomentose.

At Cedar Edge, 24 June, n. 246.

LUPINUS DICHROUS. Size and habit of the last, with similar though somewhat larger foliage, the pubescence both shorter and more scanty, perhaps best described as silvery-

canescent; raceme short-peduncled, less elongated, open and subverticillate; pedicels and short gibbous calyx velvety: corolla at first white, the banner only at length changing to reddish-purple, this rather shorter than the other petals; keel rather broadly lunate and not long-pointed, strongly woolly-ciliate throughout: pods oblong-linear, 1½ inches long, silky-tomentose, 5-seeded; seeds flat, white.

Also at Cedar Edge, 24 June, n. 249; the strictly two-colored rather large corollas rendering the plant very attractive.

Lupinus amplus. Stems clustered, stout, 3 feet high, very leafy with leaves of the largest dimensions, the thin elliptic-lanceolate acute leaflets about 10 and 3 to 5 inches long, green and glabrous above, sparsely appressed-silky-hairy beneath and more strongly so on the margin; the stem and peduncles villous: raceme sessile, 10 inches long, both broad and rather dense, nowhere subverticillate: pedicels ½ inch long or more, densely hirsute, as also the short calyx: corolla of the largest, ¾ inch long; banner shortest, dark-purple; wings violet, conspicuously striate-veined with purple; keel falcate, slender-pointed, hirtellous-ciliate above the middle: pods not seen, but ovaries silky-tomentose.

At Cerro Summit above Cimarron, 17 June, n. 164. Very large and showy, recalling *L. magnus* of the Californian seaboard, almost as large, but not succulent; and quite as distinct from the far-northwestern *L. polyphyllus*.

Lupinus leptostachyus. Clustered stems stout, very erect, 2 feet high or more, with relatively small leaves and the smallest of flowers in very long racemes: leaflets about 9, oblong-linear, abruptly acute, unequal, the longest 1½